Mathematics

	Units
Associate in Arts Degree:	
Mathematics	22-23*
Applied Mathematics	31*

*and courses to meet graduation requirements, general education and electives as needed to meet minimum of 60 units required for the degree.

Description

Mathematics is the study of numbers, structures, and associated relationships using rigorously defined literal, numerical and operational symbols. Given certain conditions about systems of numbers or other structures mathematicians derive conclusions based on logical arguments. Basic mathematical skills enable a person to solve numerical problems encountered in daily life, and more advanced skills have numerous applications in the physical, social and life sciences.

Program Emphasis

The mathematics curriculum includes courses that range from basic skills through differential equations. The basic skills and associate degree level courses provide students with the mathematical preparation necessary for study in other disciplines, as well as for degree and transfer requirements. Successful completion of a mathematics degree will develop competence in mathematics through differential and integral calculus, providing an adequate background for employment in many technological and scientific areas. Furthermore, it provides a firm foundation for students planning to study mathematics, engineering, economics, computer science, physical, or life sciences.

Faculty	Office	Telephone
Misael Camarena	M-108	(619) 388-3637
Theresa Gallo	M-109	(619) 388-3350
Carlos de la Lama	M-211	(619) 388-3362
David Kater	M-106	(619) 388-3252
Miriam Keesey	SDSU	(619) 594-2696
Jenny Kimm	M-109	(619) 388-4053
Karon Klippe	M-109	(619) 388-3638
Hoat Le	M-110	(619) 388-3639
Kirsten Lollis	M-108	(619) 388-3251
Han Long	M-110	(619) 388-3351
Jim Mahler	M-111	(619) 388-3640
Manfred C. Smith	M-208	(619) 388-3352
Yu-Hua A. Sun	M-107	(619) 388-3646
Carolyn R. Thomas	M-211	(619) 388-3363
Thomas Voden	M-107	(619) 388-3364
Mathematics Center	T-208	(619) 388-3580

Career Options

Most of these occupations require education beyond the associate degree, and some may require a graduate degree. The following list is not intended as a comprehensive list of career options in mathematics: actuary, appraiser, assessor, auditor, biometrician, budget analyst, controller, computer analyst, computer programmer, demographer, econometrician, engineering analyst, epidemiologist, financial analyst, investment analyst, management scientist, operations researcher, research mathematician, statistician, surveyor, systems analyst, teacher, technical writer, and urban planner.

Academic Programs

The associate degree in Mathematics requires completion of the courses listed below. Additional general education and graduation requirements for the associate degree are listed in the catalog. The associate degree requires a minimum of 60 units.

Associate in Arts Degree: Mathematics

Courses Required for the Major: **Units**

MATH 150, Calculus & Analytical Geometry I 5
MATH 151, Calculus & Analytical Geometry II 4
MATH 245, Discrete Mathematics 3
MATH 252, Calculus & Analytical Geometry III 4
MATH 254, Introduction to Linear Algebra..... 3

Select three to four units from:

MATH 107, 107L, Introduction to Scientific Programming and Lab,
MATH 119, Elementary Statistics
MATH 255, Differential Equations (for University of California transfer)
PHIL 101, Symbolic Logic..... 3-4

Total Units = 22-23

Recommended electives: Mathematics 104, 108, 108L, 116, 118, 121, 122, 141, 150L, 210A,B, 237, 237L, 255.

Courses offered in Support of Other Majors:

Mathematics 90, 91, 95, 96.

Associate in Arts Degree: Mathematics

Applied Mathematics

Courses Required for the Major: **Units**

MATH 107, 107L, Introduction to Scientific Programming & Lab 3,1
MATH 108, 108L, Intermediate Scientific Programming & Lab 3,1
MATH 150, Calculus & Analytical Geometry I..... 5
MATH 151, Calculus & Analytical Geometry II 4
MATH 237, 237L, Machine & Assembly Language & Lab 3,1
MATH 245, Discrete Mathematics 3
MATH 252, Calculus & Analytical Geometry III 4
MATH 254, Introduction to Linear Algebra..... 3

Total Units = 31

Recommended electives: Mathematics 104, 116, 118, 119, 121, 122, 141, 150L, 210A,B, 255, 290, 296.

Transfer Information

Common university majors related to the field of Mathematics include:
Applied Mathematics, Cognitive Science, Liberal Studies, Mathematics, Statistics.

Course Requirements for Transfer Students

Students who plan to transfer to a four year college or university and earn a bachelor's degree in this discipline should consult with a counselor or visit the Transfer/Career Center to determine the appropriate major preparation courses for their specific transfer institution and major. Transfer students may also earn an Associate of Arts degree in Transfer Studies. This degree is individually tailored to each student's specific transfer requirements in order to provide the most efficient path to transfer. More information on transfer programs and procedures is available in the Transfer Programs section of the catalog.

Courses

Mathematics (MATH)

Basic Skills Courses

All courses at this level are offered for college credit. Credit for these courses will not apply toward the associate degree but will count toward the determination of a student's workload and eligibility for financial aid.

015A Prealgebra Refresher

3 hours lab, 1 unit
Credit/No Credit Only

This course is intended for those students who have completed the math assessment with a level of M20 (prealgebra) and wish to improve their placement level; those students who have successfully completed Mathematics 35 but need more review; or students who unsuccessfully attempted Mathematics 95 and need review of prealgebra skills. The course will consist of lecture classes and/or independent study using a computer program to refresh those concepts identified as needed for each student. Successful completion of this course may serve as a basic for a petition to challenge Mathematics 35. This course will not replace a failing grade in Mathematics 35. Not Applicable to Associate Degree, pre-collegiate basic skills - reading, writing, computation.

015B Elementary Algebra Refresher

3 hours lab, 1 unit
Credit/No Credit Only

This course is intended for those students who have completed the math assessment with a level of M30 (beginning algebra) and wish to improve their placement level; students who have successfully completed Mathematics 15A; students who have successfully completed Mathematics 95 but need more review; or students who unsuccessfully attempted Mathematics 96 and need review of beginning algebra skills. The course will consist of lecture classes and/or independent study using a computer program to refresh those concepts identified as needed for each student. Successful completion of this course may serve as a basis for a petition to challenge Mathematics 95. This course will not replace a failing grade in Mathematics 95. Not Applicable to Associate Degree, pre-collegiate basic skills - reading, writing, computation.

015C Intermediate Algebra Refresher

3 hours lab, 1 unit
Credit/No Credit Only

This course is intended for those students who have completed the math assessment with a level of M40 (intermediate algebra) and wish to improve their placement level; students who have successfully completed Mathematics 15B; students who have successfully completed Mathematics 96 but need more review; or students who unsuccessfully attempted Mathematics 104, 116, 141or 210A and need review of intermediate algebra skills. The course will consist of

lecture classes and/or independent study using a computer program to refresh those concepts identified as needed for each student. Successful completion of this course may serve as a basis for a petition to challenge Mathematics 96. This course will not replace a failing grade in Mathematics 96. Not Applicable to Associate Degree, pre-collegiate basic skills - reading, writing, computation.

032 Fundamentals of Mathematics

5 hours lecture, 5 units
Grade Only

Fundamentals of Mathematics serves as an introduction to fundamental concepts of arithmetic. This course covers the arithmetic operations of addition, subtraction, multiplication, division and exponentiation on whole numbers, fractions, decimals and percents; ratios and proportions, an introduction to the different systems of measurement, and applications of these topics. This course is intended for preparation for Prealgebra (Math 35). (FT) This course does not apply to the Associate Degree.

035 Prealgebra

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Advisory: Mathematics 32 with a grade of "C" or better, or equivalent, or Assessment Skill Level M20.
This course introduces students to the fundamentals of arithmetic operations, their applications, and an introduction to some elementary topics in beginning algebra. The course covers arithmetic operations on integer, rational, and decimal number fractional, percent and decimal notation, introduction to algebraic expressions, solving equations and graphing, ratios and proportions, perfect squares and their square roots, elementary topics in geometry, systems of measurement, and monomial arithmetic. (FT) Not Applicable to Associate Degree, pre-collegiate basic skills, English as a Second Language.

Associate Degree Credit Courses

090 Fundamentals of Mathematics

3 hours lecture, 3 units
Credit/No Credit Only

Limitation on Enrollment: This course is not open to students with previous credit for Mathematics 54 or 95.
This course is intended for students who have not passed the California State University Entry-Level Mathematics Examination (ELM). This course reviews arithmetic and geometric concepts, and covers topics in elementary algebra including operations with polynomials, factoring, rational expressions, expressions involving radicals, solving non-linear equations, graphing linear equations, and solving linear systems of equations in two variables.
Associate Degree Credit only and not Transferable.

091 Algebra for Math Placement

3 hours lecture, 3 units
Credit/No Credit Only

Advisory: Mathematics 90 with a grade of "C" or better, or equivalent.
Limitation on Enrollment: The course is not open to students with previous credit for Mathematics 96 or Mathematics 100.
This course is a continuation of Mathematics 90 and is intended for those students who have not passed the California State University Entry-Level Mathematics Examination (ELM). This course is designed to prepare students for college algebra and consists of a review of intermediate algebra concepts. Topics for the class include set and function notation, simplifications and solutions to equations involving rational and radical expressions, quadratic equations and functions, complex numbers, exponential and logarithmic functions and applications. Associate Degree Credit only and not Transferable.

095 Elementary Algebra and Geometry

5 hours lecture, 5 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 35 with a grade of "C" or better, or equivalent, or Assessment Skill level M30.
Advisory: Completion of or concurrent enrollment in: English 43 and English 56, each with a grade of "C" or better, or equivalent, or Assessment Skill Level W4 and R5.
Limitation on Enrollment: This course is not open to students with previous credit for Mathematics 54 or 54A & 54B.
Elementary algebra and geometry serves as the foundation for the other math courses and is the first of a two-course integrated sequence in algebra and geometry intended to prepare students for transfer level mathematics. This course covers the real number system; writing, simplifying, solving and graphing of linear equations in one variable; solving linear inequalities in one variable; solving systems of linear equations in two variables; algebraic operations with polynomial expressions and factoring; functions; operations involving rational expressions and related equations; and geometric properties of lines, angles, and triangles.This course is the prerequisite for Math 96 and also satisfies the communication and analytical thinking G.E. requirement for an AA degree. (FT)
Associate Degree Credit only and not Transferable.

096 Intermediate Algebra and Geometry

5 hours lecture, 5 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 95 with a grade of "C" or better, or equivalent, or Assessment Skill Level M40.
Advisory: English 43 and English 56, each with a grade of "C" or better, or equivalent, or Assessment Skill Levels W4 and R5.
Intermediate Algebra and Geometry is the second of a two-semester integrated sequence in algebra and geometry. This course covers systems of equations and inequalities; radical and quadratic equations; quadratic functions and their graphs; complex numbers; nonlinear inequalities; exponentials and logarithmic functions; conic sections; sequences and series; and solid geometry. The course will also include application problems involving the topics covered. This course is the prerequisite for numerous collegiate level/transfer level mathematics courses. (FT) Associate Degree Credit only and not Transferable.

Transfer Level Courses

104 Trigonometry

3 hours lecture, 3 units
Grade Only

Prerequisite: Mathematics 96 with a grade of "C" or better, or equivalent, or Assessment Skill Level M50.
This course is a study of the numerical, analytical, and geometric properties of right and oblique triangles, of trigonometric and inverse trigonometric functions, and their applications. The course content includes right angle trigonometry, radian measure, circular functions, graphs of circular functions and their inverses, trigonometric identities, equations involving trigonometric and inverse trigonometric functions, an introduction of the complex plane, vectors and their operations, and the trigonometric form of complex numbers. This course is designed as a preparation for calculus and it is intended for the transfer student planning to major in mathematics, engineering, economics, or disciplines included in the physical or life sciences. This course meets CSU general education requirements. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. (CAN MATH 8).

107 Introduction to Scientific Programming

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 96 with a grade of "C" or better, or equivalent, or Assessment Skill Level M50.
Corequisite: Mathematics 107L.
Advisory: English 56 with a grade of "C" or better, or equivalent, or Assessment Skill Level R5.
This course is an introduction to mathematical and scientific problem-solving on a computer; focusing on designing algorithms of a high level programming language. Extensive programming is required. Students are expected to plan and write programming projects with documentation. This course is recommended for students transferring to majors in Computer Science and/or mathematics. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List.

107L Introduction to Scientific Programming Lab

3 hours lab, 1 unit
Letter Grade or Credit/No Credit Option

Corequisite: Mathematics 107.
This is a lab course to be taken concurrently with Mathematics 107. Extensive programming is required. Students are expected to plan and write programming projects with documentation. This course is recommended for students transferring to majors in Computer Science and/or mathematics. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities.

108 Intermediate Scientific Programming

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 107 with a grade of "C" or better, or equivalent.
Advisory: Concurrent enrollment in Mathematics 108L.
This course provides further training in program design and development, especially with regard to large projects. Advanced techniques in programming are studied along with basic data structures and algorithms. Problem-solving techniques in the fields of engineering, mathematics, and the sciences are covered. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List.

108L Intermediate Scientific Programming Lab

3 hours lab, 1 unit
Letter Grade or Credit/No Credit Option

Corequisite: Mathematics 108.
This is a lab course open only to those concurrently enrolled in Mathematics 108. Extensive programming is required. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities.

116 College and Matrix Algebra

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 96 with a grade of "C" or better, or equivalent, or Assessment Skill Level M50.
Advisory: English 56 each with a grade of "C" or better, or equivalent, or Assessment Skill Level R5.
This course is designed to strengthen the algebra skills of students seeking Business or Natural Science degrees that are required to take an applied calculus course. Topics in the course include the theory of functions; graphing functions; exponential and logarithmic functions; solving equations involving algebraic, exponential and logarithmic functions; solving systems of linear equations, matrix algebra, linear programming, modeling, and applications problems. Analytical reading and problem solving are required for success in this course. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List: Mathematics (MATH) 116 and 141 combined: maximum credit, four units. (CAN MATH 10).

118 A Survey of Modern Mathematics

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 96 with a grade of "C" or better, or equivalent, or Assessment Skill Level M50.
Advisory: English 101 with a grade of "C" or better, or equivalent, or Assessment Skill Levels W6 and R6.
This course covers topics in probability, statistics, logical reasoning, quantitative literacy, the history of mathematics, and applications of mathematics to the real world. This is a general education course designed for students who do not intend to prepare for a career in science or business. Analytical reading and problem solving are required for success in this course. Associate Degree Credit & transfer to CSU and/or private colleges and universities. (CAN MATH 2).

119 Elementary Statistics

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 96 with a grade of "C" or better, or equivalent, or Assessment Skill Level M50.
This course covers descriptive and inferential statistics. The descriptive portion analyzes data through graphs, measures of central tendency and spread. Other statistical practices utilize basic probability, binomial and normal distributions, estimation of population parameters, hypothesis testing, linear regression and correlation. Analytical reading and problem solving are required for success in this course. This course meets district G.E. requirements. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List: Mathematics (MATH) 119, Biology (BIOL) 200 and Psychology (PSYC) 258 combined: maximum credit, one course. (CAN STAT 2).

121 Basic Techniques of Applied Calculus I

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 116 with a grade of "C" or better, or equivalent.
This is a course designed for students intending to major in business, natural science or social science. It does not fulfill a mathematics requirement for students majoring in mathematics, chemistry, physics or engineering. This course combines the study of algebra, analytic geometry, and calculus using numerical, graphical, and analytical methods to analyze calculus problems encountered in real world applications. Topics include limits, derivatives, and integrals of algebraic, exponential and logarithmic functions. Also covered are functions of several variables, partial derivatives, and optimization of multivariable functions. Applications of calculus include curve sketching, optimization, and areas under curves. Analytical reading and problem solving are required for success in this course. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List: Mathematics (MATH) 121 and 150 combined: maximum credit, one course. (CAN MATH 30) *(CAN MATH SEQ D = MATH 121 + 122)*.

122 Basic Techniques of Calculus II

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 121 with a grade of "C" or better, or equivalent.
In this continuation of Mathematics 121, students intending to major in business, natural science, or social science learn about integration, multivariable functions, differential equations, series, and formatting trigonometric functions. This course does not fulfill a mathematics requirement for students intending to major in mathematics, chemistry, physics, or engineering. Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List: Mathematics (MATH) 122 and 151 combined: maximum credit, one course. (CAN MATH 32). *(CAN MATH SEQ D = MATH 121 + 122)*.

141 Precalculus

5 hours lecture, 5 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 104 with a grade of "C" or better, or equivalent.

This course is a study of numerical, analytical, and graphical properties of functions. The course content includes polynomial, rational, irrational, exponential, logarithmic, and trigonometric functions. Additional topics include: inverse functions, complex numbers, polar coordinates, matrices, conic sections, sequences, series and the binomial theorem. This course is designed as a preparation for calculus and is intended for the transfer student planning to major in mathematics, engineering, economics, or disciplines included in the physical or life sciences. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List: Mathematics (MATH) 116 and 141 combined: maximum credit, one course. (CAN MATH 16).

150 Calculus with Analytic Geometry I

5 hours lecture, 5 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 141 with a grade of "C" or better, or equivalent.
This course is a primary introduction to university level calculus. The topics of study include analytic geometry, limits, differentiation and integration of algebraic and transcendental functions. Emphasis is placed on calculus applications. Analytical reading and problem solving are required for success in this course. This course is intended for the transfer student planning to major in mathematics, computer science, physics, chemistry, engineering, or economics. Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List: Mathematics (MATH) 121 and 150 combined: maximum credit, one course. (CAN MATH 18) *(CAN MATH SEQ B = MATH 150 + 151) (CAN MATH SEQ C = MATH 150 + 151 + 252)*.

150L Calculus I Laboratory

3 hours lab, 1 unit
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 141 with a grade of "C" or better, or equivalent.
Corequisite: Mathematics 150.
This course is a workshop, project-oriented course dealing with exploration and development of the calculus topics introduced in Calculus and Analytic Geometry I. This course directly supports the calculus lectures by having hands-on, collaborative assignments where technology is strongly incorporated throughout all the in-class assignments. Students work individually and in small groups on explorations and applications thus extending the material presented in Mathematics 150. Topics including geometric, analytic and numeric applications of limits, derivatives and integrals as well as calculus applications found in the physical and life sciences. This course is intended for all students currently enrolled in Mathematics 150. Instructor monitors and facilitates group and individual presentations and projects. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List.

151 Calculus with Analytic Geometry II

4 hours lecture, 4 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 150 with a grade of "C" or better, or equivalent.
This is a continuation of Mathematics 150. This course covers more advanced topics in analytic geometry, differentiation and integration of algebraic and transcendental functions, infinite series, Taylor series, and parametric equations. This course also covers a general introduction to the theory and applications of power series, techniques of integration, and functions in polar coordinates, at it serves as a basis for multivariable calculus and differential equations, as well as most upper division courses in mathematics and engineering. It is intended for the transfer student planning to major in mathematics, computer science, physics, chemistry, engineering and economics. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List: Mathematics 151 and Mathematics 122 combined: maximum credit, one course. (CAN MATH 20) *(CAN MATH SEQ B = MATH 150 + 151) (CAN MATH SEQ C = MATH 150 + 151 + 252)*.

181 Mecomtronics College Algebra and Trigonometry I

3 hours lecture, 3 units
Grade Only

Prerequisite: Mathematics 96 with a grade of "C" or better, or equivalent, or Assessment Skill Level M50.
Advisory: This course is intended for students enrolled in the first semester Engineering Technology/ Mecomtronics program.
This course is the first semester of a four-semester sequence in applied college algebra and trigonometry, and applied technical calculus. Students are expected to apply the mathematical problem solving techniques developed in this course in the real world situations presented and discussed in the program's technology and science courses. Topics include the algebra of functions, graphing algebraic functions, exponential and logarithmic functions, linear systems of equations, matrices and matrix operations, trigonometric functions and their graphs, trigonometric identities, complex numbers, vector algebra, descriptive statistics, an introduction to series and summation notation, an

introduction to Boolean algebra and symbolic logic, and the use of the graphing calculator to solve application problems. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities.

182 Mecomtronics College Algebra and Trigonometry II

3 hours lecture, 3 units
Grade Only

Prerequisite: Mathematics 181 with a grade of "C" or better, or equivalent.
Advisory: This course is intended for students enrolled in the second semester Engineering Technology/ Mecomtronics program.
This course is the second semester of a four-semester sequence in applied college algebra and trigonometry, and applied technical calculus. Students are expected to implement the mathematical problem solving techniques developed in this course in the real world situations presented and discussed in the Mecomtronics technology and science courses. Topics covered are a continuation of those introduced in Mathematics 181. Topics include applications of exponential and logarithmic functions, graphs of trigonometric functions, inverse trigonometric functions, Riemann sums, polynomial approximations of special transcendental functions, vector algebra, spherical and cylindrical coordinates, conic sections, the binomial theorem, an introduction to Boolean algebra and symbolic logic, and the use of the graphing calculator to solve application problems. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities.

183 Mecomtronics Calculus I

3 hours lecture, 3 units
Grade Only

Prerequisite: Mathematics 182 with a grade of "C" or better, or equivalent.
Advisory: This course is intended for students enrolled in the third semester Engineering Technology/ Mecomtronics program.
This course is the third semester of a four-semester sequence in applied college algebra and trigonometry, and applied technical calculus. Students are expected to implement the mathematical problem solving techniques developed in this course in the real world situations presented and discussed in the Engineering Technology/Mecomtronics program's technology and science courses. Topics include limits, continuity, differentiation of algebraic and transcendental functions, an introduction to multivariable functions and their partial derivatives, Riemann sums, integration by substitution and by parts, separable and linear first order differential equations, applications in technology and physics, and the use of the graphing calculator to solve application problems. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities.

184 Mecomtronics Calculus II

3 hours lecture, 3 units
Grade Only

Prerequisite: Mathematics 183 with a grade of "C" or better, or equivalent.
Advisory: This course is intended for students enrolled in the fourth semester Engineering Technology/ Mecomtronics program.
This course is the fourth semester of a four-semester sequence in applied college algebra and trigonometry, and applied technical calculus. Students are expected to apply analytical reading and mathematical problem solving techniques developed in this course in real world situations presented and discussed in the Engineering Technology/Mecomtronics program's technology and science courses. Topics include Taylor series, Fourier series, techniques of multivariable calculus including partial derivatives, multiple integrals, line and surface integrals, applications in physics and technology of vector calculus theorems, first and second order differential equations, variation of parameters, and Laplace transforms. A strong emphasis is placed on calculus applications in the engineering technology field. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities.

210A Concepts of Elementary School Mathematics I

3 hours lecture, 3 units
Grade Only

Prerequisite: Mathematics 96 with a grade of “C” or better, or equivalent, or Assessment Skill Level M50.
Advisory: English 101 with a grade of “C” or better, or equivalent, or Assessment Skill Levels W6 and R6; or English 105 with a grade of “C” or better, or equivalent.
This course is a study of the mathematical concepts needed for teaching elementary school mathematics with emphasis on number and function. This course promotes an appreciation of the importance of logical thinking and applications of mathematics in problem solving and critical thinking. It studies the basic computational skills, but also requires the understanding and explanation of the basic mathematical concepts and the connections between them. It is designed especially for students preparing for credentials in elementary education. Analytical reading and problem solving are required for success in

this course. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC transfer Course List: Mathematics (MATH) 210A and 210B combined: maximum credit, one course. (CAN MATH 4).

210B Concepts of Elementary School Mathematics II

3 hours lecture, 3 units
Grade Only

Prerequisite: Mathematics 210A with a grade of "C" or better, or equivalent.
Advisory: English 101 with a grade of "C" or better, or equivalent, or Assessment Skill Levels W6 and R6; or English 105 with a grade of "C" or better, or equivalent.
This course is a study of the mathematical concepts needed for teaching elementary school mathematics with emphasis on geometry, measurement, probability and statistics. This course also promotes an appreciation of the importance of logical thinking and applications of mathematics in problem solving and critical thinking. It studies the understanding and explanation of the basic mathematical concepts and the connections between them. It is designed especially for students preparing for credentials in elementary education. Analytical reading and problem solving are required for success in this course. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC transfer Course List: Mathematics (MATH) 210A and 210B combined: maximum credit, one course.

212 Children's Mathematical Thinking

1 hour lecture, 1 unit
Grade Only

Advisory: Concurrent enrollment in Mathematics 210A.
This course focuses on children's mathematical thinking and includes an in-depth study of place-value, fractions and how children solve mathematical problems. Students observe children and evaluate the problem strategies that are used. For students in San Diego State University's Liberal Studies Blended Teacher Education Program, this course is required and must be taken concurrently with Mathematics 210A. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities.

237 Machine and Assembly Language

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 108 with a grade of "C" or better, or equivalent.
Corequisite: Mathematics 237L.
Limitation on Enrollment: This course is not open to students with credit for Mathematics 137.
This course covers general concepts of machine and assembly languages, including data representation, looping and addressing techniques, subroutine linkage, and use of system and programmer-defined macros. Problem-solving techniques in the fields of engineering, mathematics, and the sciences are covered. This course is designed for computer science and mathematics majors who are intending to transfer to a four-year university. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List. (CAN CSCI 10, when taken with MATH 237L).

237L Assembly Language Lab

3 hours lab, 1 unit
Letter Grade or Credit/No Credit Option

Corequisite: Mathematics 237.
Limitation on Enrollment: This course is not open to students with credit for Mathematics 137L.
This is a lab course to be taken concurrently with Mathematics 237. Practice is provided in applying programming techniques and problem solving skills using assembly language. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List. (CAN CSCI 10, when taken with MATH 237).

245 Discrete Mathematics

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 122 or 151 with a grade of "C" or better, or equivalent.
Advisory: English 101 with a grade of "C" or better, or equivalent, or Assessment Skill Level W6 and R6.
This course is an introduction to the theory of discrete mathematics and introduces elementary concepts in logic, set theory, number theory, and combinatorics. The topics covered include prepositional and predicate logic, methods of proof, set theory, Boolean algebra, number theory, equivalence and order relations, counting techniques, and recursion. This course forms a basis for upper division courses in mathematics and computer science and it is intended for the transfer student planning to major in these disciplines. Associate Degree Credit & transfer to CSU and/or Private colleges and universities. UC Transfer Course List. (CAN CSCI 26).

252 Calculus with Analytic Geometry III

4 hours lecture, 4 units
Grade Only

Prerequisite: Mathematics 151 with a grade of "C" or better, or equivalent.
The content of this course includes the algebra and geometry of 2- and 3-dimensional Euclidean vectors, limits, continuity, partial differentiation, extrema of vector-valued and multivariable functions, higher order derivatives, the chain rule, Lagrange's theorem, multiple integrals, integrals over paths and surfaces, and integral theorems of vector analysis. This course is intended as a general introduction to the theory and applications of multivariable calculus. It is essential for most upper division courses in mathematics and forms part of the foundation for engineering and physics. It is intended for the transfer student planning to major in mathematics, physics, engineering, computer science, physical chemistry, operational research, or economics. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List. (CAN MATH 22) *(CAN MATH SEQ C = MATH 150 + 151 + 252)*.

254 Introduction to Linear Algebra

3 hours lecture, 3 units
Letter Grade or Credit/No Credit Option

Prerequisite: Mathematics 151 with a grade of "C" or better, or equivalent.
This course serves as an introduction to the theory and applications of elementary linear algebra, and is the basis for most upper division courses in mathematics. The topics covered in this course include matrix algebra, Gaussian Elimination, systems of equations, determinants, Euclidean and general vector spaces, linear transformations, orthogonality and inner product spaces, bases of vector spaces, the change of basis theorem, eigenvalues and eigenvectors, the rank and nullity of matrices and of linear transformations. This course is intended for the transfer student planning to major in mathematics, physics, engineering, computer science, operational research, economics, or other sciences. Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List. (CAN MATH 26).

255 Differential Equations

3 hours lecture, 3 units
Grade Only

Prerequisite: Mathematics 252 and 254, each with a grade of "C" or better, or equivalent.
Limitation on Enrollment: This course is not open to students with credit for Mathematics 253.
This course covers first order and higher order equations and their applications. Topics include linear first order and higher order equations, homogeneous and nonhomogeneous equations with constant or variable coefficients, and systems of ordinary differential equations. Methods used to solve equations include substitution methods, integrating factors, reduction of order, variation of parameters, power series solutions, and Laplace Transforms. This course is intended as an introduction to the theory and applications of differential equations and is the basis for many upper division courses in engineering, physics, and mathematics. It is intended for the transfer student planning to major in mathematics, engineering, operational research, physics, or other physical science. This course meets CSU general education requirements. (FT) Associate Degree Credit & transfer to CSU and/or private colleges and universities. UC Transfer Course List. (CAN MATH 24).

290 Independent Study

Hours by Arrangement, 1-3 units
Letter Grade or Credit/No Credit Option

Limitation on Enrollment: Must obtain an Add Code from instructor for registration.
This course is for advanced students who wish to pursue special investigations. This course may be taken four times with different content for a maximum of six units. Associate Degree Credit & transfer to CSU and/or private colleges and universities.

This discipline may offer specialized instruction in one or more of the following areas: Supervised Tutoring (044), Special Topics (265), Independent Study (290), Individualized Instruction (296), Service Learning (277), or Work Experience (270). Detailed course descriptions are listed on page 100. Please refer to the class schedule and/or see the dean or department chair for availability.

Music

See "Visual and Performing Arts" on page 368.

Multimedia

See "Communications" on page 162.