Mathematics

Mathematics, the abstract, deductive study of pattern and structure, is the foundation of all science and technology programs, such as biological, physical, computer, behavioral, and social sciences as well as engineering. Areas of mathematics include arithmetic, algebra, geometry, calculus, and various other theoretical and applied subjects. Students take mathematics courses to prepare for a mathematics major, to meet prerequisites in related disciplines, or to fulfill general education requirements. A bachelor's degree in mathematics can lead to a career in a computer-related field or as an actuary, accountant, mathematician, statistician, or teacher.

Academic and Career Pathway: Math and Sciences

Contact Information

Chairs: Beth Powell (Fall 2019), Leila Safaralian (Spring 2020)
Dean: Michael Fino
www.miracosta.edu/MATH

Full-Time Faculty

Janeen Apalatea
Rachid Almri
Angela Beltran
David Bonds
Keith Dunbar
Scott Fallstrom
Shawn Firouzian
Mary Beth Headlee
Mark Laurel
Apolinar Mariscal
Serena Mercado
Shannon Myers
Lemee Nakamura
Victoria Noddings
Zikica Perovic
Brent Pickett
Beth Powell
Leila Safaralian

Courses

MATH 20: Pre-Algebra
Units: 4
Prerequisites: None
Lecture 4 hours.
Course Typically Offered: Fall, Spring, and Summer

This course prepares students for Elementary Algebra (MATH 30). Topics include operations on positive and negative numbers; fractions, decimals, and percents; perimeters, areas, and volumes of geometric figures; fundamental algebraic concepts; square roots; and applications.

MATH 28: Math Fundamentals I
Units: 4
Prerequisites: None
Enrollment Limitation: Not open to students with prior credit in MATH 52.
Lecture 3.50 hours, laboratory 1.50 hours.
Course Typically Offered: Fall, Spring

This course covers the fundamentals of real numbers, pattern recognition and generalization, graphs and functions, basics of exponents, and solving of proportions and equations. It develops the relationship between realistic applications and quantitative reasoning. (Formerly MATH 52; Materials Fee: $20.00)

MATH 30: Elementary Algebra
Units: 4
Prerequisites: MATH 20, MATH 28, or eligibility determined by the math placement process.
Lecture 4 hours.
Course Typically Offered: Fall, Spring, and Summer

Designed to prepare students for intermediate algebra, this course teaches simplifying algebraic expressions involving polynomials and rational terms; factoring; solving linear equations; solving quadratic and rational equations using factoring; analyzing graphs of linear equations; and solving applied problems.

MATH 31: Support for Statistics
Units: 1
Prerequisites: MATH 30, or eligibility determined by the math placement process
Corequisite: MATH 103.
Lecture 0.50 hour, laboratory 1.50 hours.
Course Typically Offered: Fall, Spring, and Summer

This course reviews core prerequisite skills and concepts needed in statistics and is intended for students who are concurrently enrolled in MATH 103. Topics include concepts from arithmetic, pre-algebra, elementary and intermediate algebra, and descriptive statistics that are needed to understand the basics of college-level statistics. Concepts are taught through the context of descriptive data analysis and are presented strategically throughout the semester to provide a just in time instruction of prerequisite skills needed to master concepts in MATH 103 as they arise. Additional emphasis is placed on graphing linear equations and modeling with linear functions. Offered pass/no pass only.
Mathematics

MATH 32: Support for Intermediate Algebra
Units: 2
Prerequisites: MATH 20, MATH 28, or eligibility determined by the math placement process
Corequisite: MATH 64.
Lecture 1 hour, laboratory 3 hours.
Course Typically Offered: Fall, Spring, and Summer

This course reviews the core prerequisite skills and concepts for intermediate algebra and is intended for students who are eligible for enrollment in MATH 30, Elementary Algebra. Topics include computational skills developed in pre-algebra, the vocabulary of algebra, translation from English to algebra, and evaluation of literal expressions and functions. Topics covered in more depth include solving and graphing linear equations and inequalities in one and two variables, solving and graphing systems of equations in two variables, factoring, algebraic operations on polynomial and rational expressions, solving quadratics using factoring, and rational equations and inequalities. Topics in MATH 32 are taught strategically throughout the semester to provide a just in time instruction of prerequisite skills needed to master concepts in MATH 64 as they arise. Offered pass/no pass only.

MATH 34: Intermediate Algebra - Learning Assistance for Calculus with Applications
Units: 2
Prerequisites: MATH 30 or eligibility determined by the math placement process
Corequisite: MATH 115.
Lecture 2 hours.
Course Typically Offered: Fall, Spring, and Summer

This course reviews the core prerequisite skills and concepts needed to be successful in MATH 30. It is intended for business, science, technology, and engineering majors who are concurrently enrolled in MATH 115. Topics include a review of skills developed in intermediate algebra, factoring, operations on rational and radical expressions, absolute value equations and inequalities, exponential and logarithmic expressions and equations, conic sections, functions including composition and inverses, in-depth focus on quadratic functions, and a review of geometry. Topics in MATH 34 are taught strategically throughout the semester to provide a just in time instruction of prerequisite skills needed to master concepts in MATH 115 as they arise in that course. The course is appropriate for students who are confident in their graphing and beginning algebra skills. Offered pass/no pass.

MATH 36: Intermediate Algebra- Learning Assistance for Pre-Calculus
Units: 2
Prerequisites: MATH 30 or eligibility determined by the math placement process
Corequisite: MATH 126.
Lecture 2 hours.
Course Typically Offered: Fall, Spring, and Summer

This course reviews the core prerequisite skills and concepts needed for success in precalculus and is intended for students majoring in science, technology, engineering, and mathematics who are concurrently enrolled in MATH 126. Topics include a review of computational skills developed in intermediate algebra, factoring, operations on rational and radical expressions, absolute value equations and inequalities, exponential and logarithmic expressions and equations, conic sections, functions including composition and inverses, in-depth focus on quadratic functions, and a review of geometry. Topics in MATH 36 are taught strategically throughout the semester to provide a just in time instruction of prerequisite skills needed to master concepts in MATH 126 as they arise. This course is appropriate for students who are confident in their graphing and beginning algebra skills. Offered pass/no pass.

MATH 64: Intermediate Algebra
Units: 4
Prerequisites: MATH 30 or eligibility determined by the math placement process.
Enrollment Limitation: Concurrent enrollment in MATH 32 if prerequisite not met. Not open to students with prior credit in MATH 101 or MATH 101B.
Lecture 4 hours.
Course Typically Offered: Fall, Spring, and Summer

This algebra course covers radicals, exponents, concepts of relations and functions, exponential and logarithmic functions, linear and quadratic functions, and the solutions of equations from these topics.

MATH 102: Math Fundamentals II: Mathematics for Life
Units: 4
Prerequisites: MATH 28, MATH 30, or eligibility determined by the math placement process.
Enrollment Limitation: Not open to students with prior credit in MATH 95.
Acceptable for Credit: CSU, UC
Lecture 3.50 hours, laboratory 1.50 hours.
Course Typically Offered: Fall, Spring, and Summer

This course covers the fundamentals of logic, including fallacies, inductive and deductive reasoning, conditional statements, and the evaluation of arguments; the basic ideas of finance, including simple and compound interest, amortized loans, and retirement accounts; ideas of probability and applications of probability to realistic situations; and problem solving and data analysis techniques. The course provides students with a strong foundation in quantitative reasoning and mathematical concepts applicable to everyday life situations and long-term decision-making strategies. (Formerly MATH 95; Materials Fee: $20.00)
MATH 103: Statistics
Units: 4
Prerequisites: MATH 64 or MATH 102 or eligibility determined by the math placement process.
Enrollment Limitation: Concurrent enrollment in MATH 31 if prerequisite not met.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring, and Summer
This course introduces data analysis. Topics include data collection, descriptive statistics, probability, sampling, estimation, significance testing, and correlation and regression. Students use appropriate technology to analyze real-world data. UC CREDIT LIMITATION: Credit for BUS 204, MATH 103, PSYC 104/SOC 104, PSYC 104H/SOC 104H, or BIO 180/BTEC 180. Some CSU campuses may also impose this credit limitation.

MATH 105: Concepts and Structures of Elementary Mathematics I
Units: 3
Prerequisites: MATH 64 or eligibility determined by the math placement process.
Acceptable for Credit: CSU, UC
Lecture 2 hours, laboratory 3 hours.
Course Typically Offered: Fall, Spring
This course covers set theory, problem solving, systems of numeration, elementary number theory, numerical operations, and arithmetic algorithms. It emphasizes cognitive learning and the development of problem solving strategies and techniques. Students work collaboratively in groups and/or independently using manipulatives and models to explore structures and formulate concepts. UC CREDIT LIMITATION: Credit for MATH 105 or MATH 106.

MATH 106: Concepts and Structures of Elementary Mathematics II
Units: 3
Prerequisites: MATH 105.
Acceptable for Credit: CSU, UC
Lecture 2 hours, laboratory 3 hours.
Course Typically Offered: Spring
This continuation of MATH 105 covers the mathematical concepts needed for teaching elementary school mathematics. Core topics include the real number system, geometry, Pythagorean theorem, measurement in both the English and metric systems, transformations, and symmetry. Students must demonstrate their understanding of the concepts and structures of elementary mathematics using critical thinking. UC CREDIT LIMITATION: Credit for MATH 105 or MATH 106.

MATH 112: Mathematical Analysis
Units: 3
Prerequisites: MATH 64 or eligibility determined by the math placement process.
Acceptable for Credit: CSU, UC
Lecture 3 hours.
Course Typically Offered: Fall, Spring, and Summer
This course is designed around applications of mathematics in economic and business contexts. The course addresses business models that incorporate linear, quadratic, polynomial, rational, exponential, and logarithmic functions. It covers business-related models: break even analysis, market equilibrium, compound interest, annuities, and loans and amortization. The course also addresses mathematical topics: optimization, rates of change, and linear programming.

MATH 115: Calculus with Applications
Units: 4
Prerequisites: MATH 64 or eligibility determined by the math placement process.
Enrollment Limitation: Concurrent enrollment in MATH 34 if prerequisite not met.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring, and Summer
This course relates calculus to real-world applications in social science, economics, and business. Topics include an algebra review, graphing, limits, derivatives of polynomials of one variable, maxima and minima, integration, derivatives of logarithmic and exponential functions, development of integration techniques, an introduction to multi-variable calculus, and their application to problems. This course is designed primarily for students majoring in social science, economics, and business who require calculus and is not recommended for mathematics, physical science, engineering, or biological science majors. UC CREDIT LIMITATION: Credit for MATH 115, MATH 150 or MATH 150H. C-ID MATH-140.

MATH 126: Pre-Calculus I: College Algebra
Units: 4
Prerequisites: MATH 64 or eligibility determined by the math placement process.
Enrollment Limitation: Concurrent enrollment in MATH 36 if prerequisite not met. Not open to students with prior credit in MATH 135.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring, and Summer
This course covers advanced algebra topics including functions and their properties. Topics include linear, quadratic, polynomial, rational, exponential, and logarithmic functions and their applications, graphs of functions, inverse functions, and systems of equations and inequalities. UC CREDIT LIMITATION: MATH 126 and MATH 131 combined, maximum credit, 5 units.
MATH 131: Pre-Calculus II: Trigonometry and Analytic Geometry
Units: 4
Prerequisites: MATH 126 or eligibility determined by the math placement process.
Enrollment Limitation: Not open to students with prior credit in MATH 135 or MATH 131H.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring, and Summer

This course covers basic concepts of analytic geometry and trigonometry, including definitions and properties of trigonometric functions. Topics include solutions of applied problems involving right triangles; graphs of trigonometric functions; trigonometric identities; trigonometric equation solving; evaluation of inverse trigonometric functions and polar coordinates. The course also covers conics, systems of non-linear equations, and sequences and series. UC CREDIT LIMITATION: MATH 126, MATH 131, and MATH 135 combined, maximum credit, 5 units.

MATH 131H: Pre-Calculus II: Trigonometry and Analytic Geometry (Honors)
Units: 4
Prerequisites: MATH 126 or eligibility determined by the math placement process.
Enrollment Limitation: Not open to students with prior credit in MATH 135 or MATH 131.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring

This course covers basic concepts of analytic geometry and trigonometry, including definitions and properties of trigonometric functions. Topics include solutions of applied problems involving right triangles; graphs of trigonometric functions; trigonometric identities; trigonometric equation solving; evaluation of inverse trigonometric functions and polar coordinates. The course also covers conics, systems of non-linear equations, and sequences and series. The course provides mathematically talented students the opportunity to obtain a level of rigor above the level currently available in existing courses. It emphasizes logical reasoning, problem solving, and applications. UC CREDIT LIMITATION: MATH 126 and MATH 131H maximum credit 5 units. Credit for MATH 131 or MATH 131H.

MATH 150: Calculus and Analytic Geometry I
Units: 5
Prerequisites: MATH 131, MATH 131H, or MATH 135 or eligibility determined by the math placement process.
Enrollment Limitation: Not open to students with prior credit in MATH 150H.
Acceptable for Credit: CSU, UC
Lecture 5 hours.
Course Typically Offered: Fall, Spring, and Summer

This course is the first in a three-semester calculus sequence designed for mathematics, science, and engineering majors. Topics include limits and continuity; differentiation of algebraic, trigonometric, and exponential functions and their inverses; integration and the fundamental theorem of calculus; and applications of differentiation and integration. UC CREDIT LIMITATION: Credit for MATH 115, MATH 150 or MATH 150H. C-ID MATH-211.

MATH 150H: Calculus and Analytic Geometry (Honors)
Units: 5
Prerequisites: MATH 131, MATH 131H, or MATH 135 or eligibility determined by the math placement process.
Enrollment Limitation: Not open to students with prior credit in MATH 150.
Acceptable for Credit: CSU, UC
Lecture 5 hours.
Course Typically Offered: Fall or Spring

This first in a three-semester calculus sequence is designed for highly motivated mathematics, science, and engineering majors. Topics include limits and continuity; differentiation of algebraic, trigonometric, and exponential functions and their inverses; integration and the fundamental theorem of calculus; and applications of differentiation and integration. The course provides mathematically talented students the opportunity to obtain a level of rigor above the level currently available in existing courses. It emphasizes logical reasoning, problem solving, and applications. UC CREDIT LIMITATION: Credit for MATH 115, MATH 150, or MATH 150H. C-ID MATH-211.

MATH 155: Calculus and Analytic Geometry II
Units: 4
Prerequisites: MATH 150 or MATH 150H.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring, and Summer

This second course in a three-semester calculus sequence covers advanced integration techniques, improper integrals, infinite series, conic sections, parametric equations, and polar coordinates. The course is designed for mathematics, science, and engineering majors.
MATH 226: Discrete Mathematics
Units: 4
Prerequisites: MATH 131, MATH 131H, CS 150, or eligibility determined by the math placement process.
Enrollment Limitation: Not open to students with prior credit in MATH 226H.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring

Designed for students majoring in mathematics or computer science, this course introduces discrete mathematics, including logic, methods of proof, number theory, sets, counting, discrete probability, relations, recursion, recurrence relations, Boolean algebra, graphs, trees, and networks. Topics are illustrated with applications to computer science, including design and analysis of algorithms, undecidability, program correctness, and digital logic design. UC Credit Limitation: Credit for MATH 226 or MATH 226H.

MATH 226H: Discrete Mathematics (Honors)
Units: 4
Prerequisites: MATH 131, MATH 131H, CS 150, or eligibility determined by the math placement process.
Enrollment Limitation: Not open to students with prior credit in MATH 226.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring

This third course in a three-semester calculus sequence offers an enriched experience for highly motivated students. It covers vectors in the plane and three-dimensional space, quadratic surfaces, vector-valued functions, functions of several variables, partial differentiation and multiple integration, vector fields, and line integrals. The course is designed for mathematics, science, and engineering majors and for students interested in a thorough analysis of concepts, proofs of main results, and connections with other disciplines, particularly probability, physics, and economics. UC CREDIT LIMITATION: Credit for MATH 260 or MATH 260H.

MATH 260H: Calculus and Analytic Geometry III (Honors)
Units: 4
Prerequisites: MATH 155
Enrollment Limitation: Not open to students with prior credit in MATH 260.
Acceptable for Credit: CSU
Lecture 3.50 hours, laboratory 1.50 hours.
Course Typically Offered: Fall, Spring, and Summer

This course introduces the theory and applications of ordinary differential equations of first and higher (mostly second) order as well as systems of linear differential equations. It includes both quantitative and qualitative methods. The course deals with theoretical aspects of existence and uniqueness of solutions as well as techniques for finding solutions using analytical, numerical, method of power-series, and Laplace transformations. C-ID MATH-240.

MATH 265: Differential Equations
Units: 4
Prerequisites: MATH 155.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring

This course introduces students to the concepts of linear algebra. Topics include matrix algebra, Gaussian elimination, determinants of a matrix, properties of determinants, vector spaces and their properties with an introduction to proofs, linear transformations, orthogonality, eigenvalues and eigenvectors, and computational methods. C-ID MATH-250. UC Credit Limitation: Credit for MATH 270 or MATH 270H.

MATH 270: Linear Algebra
Units: 4
Prerequisites: MATH 155.
Enrollment Limitation: Not open to students with prior credit in MATH 270H.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring

This course introduces students to the concepts of linear algebra. Topics include matrix algebra, Gaussian elimination, determinants of a matrix, properties of determinants, vector spaces and their properties with an introduction to proofs, linear transformations, orthogonality, eigenvalues and eigenvectors, and computational methods. C-ID MATH-250. UC Credit Limitation: Credit for MATH 270 or MATH 270H.
MATH 270H: Linear Algebra (Honors)
Units: 4
Prerequisites: MATH 155.
Enrollment Limitation: Not open to students with prior credit in MATH 270.
Acceptable for Credit: CSU, UC
Lecture 4 hours.
Course Typically Offered: Fall, Spring

This course introduces students to the concepts of linear algebra. Topics include matrix algebra, Gaussian elimination, determinants of a matrix, properties of determinants, vector spaces and their properties with an introduction to proofs, linear transformations, orthogonality, eigenvalues and eigenvectors, and computational methods. The course provides mathematically talented students the opportunity to obtain a level of rigor above the level currently available in existing courses. It emphasizes logical reasoning, problem solving, and applications. UC Credit Limitation: Credit for MATH 270 or MATH 270H.

MATH 292: Internship Studies
Units: 0.5-3
Prerequisites: None
Corequisite: Complete 75 hrs paid or 60 hrs non-paid work per unit.
Enrollment Limitation: Instructor, dept chair, and Career Center approval. May not enroll in any combination of cooperative work experience and/or internship studies concurrently.
Acceptable for Credit: CSU
Course Typically Offered: To be arranged

This course provides students the opportunity to apply the theories and techniques of their discipline in an internship position in a professional setting under the instruction of a faculty-mentor and site supervisor. It introduces students to aspects of the roles and responsibilities of professionals employed in the field of study. Topics include goal-setting, employability skills development, and examination of the world of work as it relates to the student's career plans. Students must develop new learning objectives and/or intern at a new site upon each repetition. Students may not earn more than 16 units in any combination of cooperative work experience (general or occupational) and/or internship studies during community college attendance.

MATH 296: Topics in Mathematics
Units: 1-4
Prerequisites: None
Acceptable for Credit: CSU
Lecture 1 hour.
Lecture 2 hours.
Lecture 3 hours.
Lecture 4 hours.
Course Typically Offered: To be arranged

This course gives students an opportunity to study topics in Mathematics that are not included in regular course offerings. Each Topics course is announced, described, and given its own title and 296 number designation in the class schedule.