

■ Mathematics

Program Advisors: Dr. Chock Wong, Ms. Sheryl Dohm

The mission of the Mathematics Program is to promote mathematical literacy and prepare students for careers in pure and applied mathematics, statistics, mathematics education, and other professions that require a mathematics background. In the modern world, mathematical literacy is essential in order to perform jobs well. To respond to the needs for the mathematically literate graduates and to ensure the effectiveness of learning, every Chaminade student is required to take a mathematics course specified according to his or her major. (See the three tracks of mathematics requirements under the general education requirements.) New and transfer students are expected to take a mathematics placement test which is given to place students at the appropriate level of mathematics courses. A minor in mathematics is offered.

Pre-minor requirements: MA 210 and MA 211.

Minor requirements: 12 semester hours of upper division courses in mathematics.

Learning Outcomes for the Minor in Mathematics

1. To demonstrate the understanding and skills in reading, interpreting and communicating mathematical contents which are integrated into other disciplines or appear in everyday life.
2. To gain understanding of, and practical skills in logical thinking, deductive and inductive reasoning.
3. To articulate the understanding of more advanced mathematical concepts and computational skills to support the study of other disciplines, including skills with numeric, analytic and graphic methods.
4. Where relevant, to develop mathematical maturity to undertake higher-level studies in mathematics and related fields.

Course Descriptions

Mathematics (MA)

MA 098 Basic Mathematics (3)

Three class hours per week. Improvement of basic arithmetic skills and introduction to algebra. Required of all entering students as determined by performance on the mathematics placement examination. Offered every semester on campus. *Credit not applicable to degree requirements. Offered in the Summer Bridge Program. Credit/no credit.*

MA 100 Survey of Mathematics (3)

Mathematical thought is studied through interactions between the foundations of knowledge and the study of the nature of mathematics. Topics include the basis of sets and logic, numbers and operations, algebra, geometry, measurement, financial management, probability and statistics, graphs and functions. This course fulfills the Track A general education requirement in mathematics. The course is intended as a terminal course and is not a prerequisite for any other course in mathematics. Offered every semester. Prerequisites: MA 098 or placement.

MA 102 Introductory Algebra (3)

Introductory algebra. Real numbers and their basic properties, polynomials, factoring, rational expressions, simple radicals expressions, square roots and cube roots, lines and linear equations, inequalities, $\frac{a}{b}$ systems of linear equations, and applications of equations (word problems). Credits not applicable towards the general education requirement in mathematics for any degree. Offered every semester in the Adult Evening and Online Program.

MA 103 College Algebra (3)

Algebra knowledge and skills for college studies: Sets and real number system; exponents and polynomials, rational and radical expressions; equations and inequalities with applications, including rational and radical equations, and systems of equations; introductions to analytic geometry and functions; exponential and logarithmic functions; the binomial theorem and integer functions. Fulfills Track B general education requirement in mathematics. MA103 may be used as a preparative course for the pre-calculus/calculus sequence required for degrees with upper division math requirements, such as biology, forensic sciences and biochemistry. Not open to students with credits in MA 110, MA 210, or other higher numbered mathematics courses. Offered every semester. Prerequisites: MA 098, MA 102 or placement.

MA 105 Mathematics for Elementary School Teachers (3)

This course provides prospective elementary education majors with a foundation in K-8 mathematics. Guided by NCTM Standards and through the study of concepts and properties of number systems; the four fundamental operations of arithmetic; rational number concepts and operations; and basic concepts in pre-algebra, the student will be able to undertake further study in mathematics education. Offered every semester. This course fulfills the general education requirement in mathematics for Elementary Education majors. Prerequisites: MA 098 or placement.

MA 107 Algebra for Health Care professionals (3)

Algebra for Health Care Professionals is a required course for all nursing majors. This is a college-algebra based course that also promotes math competency to prevent errors in a variety of calculations used in nursing. The Quality and Safety Education for Nurses (QSEN) competency of patient safety is addressed through application of algebraic operations that include calculations used in nursing, such as solution/dosage preparations and healthcare facilities/inventories management. Credits cannot be transferred in to meet this mathematics requirement. Fulfills Track E general education requirement in mathematics. Prerequisites: MA 098, MA 102 or placement.

MA 110 Pre-Calculus (3)

Foundation for further study in mathematics. Primarily the preparatory course for MA 210. Topics include polynomials in general, functions and inverse functions, functions and graphs, exponential and logarithmic functions, trigonometric functions and their inverses, the binomial theorem, mathematical induction, all complex numbers. Not open to students with credit in MA 210 or higher courses. Offered every semester. Prerequisites: MA 103 or placement.

MA 210 Calculus I (4)

The first course in the calculus sequence. Topics include limits, differentiation and integration of single variable functions including polynomials, rational powers, and trigonometric functions, the mean value theorem, and the fundamental theorem of calculus. Both concepts and techniques as well as application will be stressed. Fulfills Track D general education requirement in mathematics. Offered every semester. Prerequisites: MA 110 or equivalent or placement.

MA 211 Calculus II (4)

Continuation of MA 210. Differentiation and integration of transcendental functions including exponential, logarithmic, and inverse trigonometric functions, and more techniques of integration make up the first part of the course. The second part covers topics in sequences and series, limits of sequences, L'Hôpital's rule, convergence and divergence of series, Taylor series, and general discussion of power series. Offered every semester. Prerequisites: MA 210 or equivalent or placement.

English 102 and COM 101 are prerequisites for all upper division courses

MA 301 Number Theory (3)

Congruences, divisibility and primes, quadratic reciprocity, quadratic residues, the Legendre and Jacobi symbols, elementary number theoretic functions, Diophantine equations, and recurrence functions. Prerequisites: MA 105 or MA 110 or equivalent. Recommended for secondary mathematics education program.

MA 305 Mathematics for Elementary Teachers II (3)

This course provides prospective elementary education majors with a deeper and more comprehensive understanding of the fundamental concepts underlying the mathematics taught in grades K through 8. Guided by NCTM Principles and Standards, this course focuses on the big ideas of geometry, measurement, data analysis, probability and statistics. Offered spring semester. This course fulfills an upper division elective requirement in mathematics for Elementary Education majors. Prerequisites: MA 105.

MA 308 Discrete Mathematics (3)

Symbolic logic, sets and relations, algorithms, mathematical induction, counting techniques in combinatorics, recurrence relations, trees and other graphs, and other topics. Recommended for secondary mathematics education and computer and information science programs. Offered annually. Prerequisites: MA 110 or equivalent.

MA 311 Calculus III (4)

Calculus of functions of several variables. Polar coordinates, parametric equations, vectors and vector calculus, plane and space curves, partial derivatives, directional derivatives and gradients, extreme values and second-partials test, double and triple integrals, cylindrical and spherical coordinates, and Green's and Stoke's theorems. Offered annually. Prerequisites: MA 211 or equivalent.

MA 313 Differential Equations (3)

Study of ordinary differential equations leading to solutions by series. Topics also include Laplace transformations and introduction to partial differential equations. Offered annually. Prerequisites: MA 211 or equivalent.

MA 331 Introduction to Probability and Statistics (3)

Sample space, random variables, classical distributions, the central limit theorem, estimation, testing of hypotheses for parameters, the first and the second kinds of errors, correlations, regressions, and analysis of variance. Offered annually. Prerequisites: MA 110 or equivalent or placement.

MA 401 Linear Algebra (3)

Matrices, elementary row operations, vector spaces, linear transformations, determinants, applications to system of linear equations, bases and orthonormal bases, eigenvalues, and eigenvectors. Offered annually. Prerequisites: MA 110 or equivalent.

MA 402 Abstract Algebra (3)

Introduction to groups, rings, and fields. Offered alternate years. Prerequisites: MA 401 or consent of instructor; MA 301 is recommended but not required.

MA 411 Advanced Calculus I (3)

Theories on the real number system, limits, continuity, properties of continuous functions, theory of differentiation and integration, and infinite series. Restricted to one variable. Offered alternate years, according to demand. Prerequisite: MA 311, or consent of instructor.

MA 180/280/380 480 Special Topics (1-3)

Selected topics in mathematics to prepare students for specific career paths or graduate study. May be repeated for credit.

MA 490 Seminar (1)

Readings and discussion of selected topics. Minimum of one oral presentation by participant required. Repeatable for credit. Offered according to demand.