

# Mathematics Course Descriptions

## **G-MA 105 College Algebra**

*3 hours*

A study of elementary concepts of sets, fundamental properties of the real number system, linear and nonlinear relations, functions and their graphical representations, matrices and determinants, permutations and combinations, and mathematical induction. (Fall, Spring)

## **G-MA 106 Pre-Calculus**

*4 hours*

A detailed study and analysis of algebraic and transcendental functions. Includes their properties, related analytic geometry, limits and continuity. This course is recommended for student who have taken College Algebra with a grade of C or better, or have successfully completed a high school Trigonometry course. (Fall)

## **G-MA 111 Calculus I**

*4 hours*

Review of functions, graphs and models; introduction to limits, derivatives and integrals of algebraic and trigonometric functions; applications of differentiation and integration. Prerequisite: Pre-calculus or significant high school mathematics coursework highly recommended. (Spring)

## **MA 112 Calculus II**

*4 hours*

Limits, derivatives and integrals of exponential, logarithmic and inverse trigonometric functions; techniques of integration; calculus of parametric and polar-coordinate equations; infinite sequences and series; first-order differential equations. Prerequisite: G-MA 111 Calculus I with a grade of C or better. (Fall)

## **G-MA 123 Discrete Mathematics**

*3 hours*

A study of some of the basic topics of discrete mathematics, including elementary logic, properties of sets, functions and relations, mathematical induction, counting problems using permutations and combinations, trees, elementary probability, and an introduction to graph theory. (Fall, even years)

## **G-MA 153 Principles of Geometry**

*3 hours*

A coverage of the basic principles of Euclidean geometry. Topics include points, lines, segments, rays, angles, congruence, parallel lines, polygons (special attention is given to triangles and quadrilaterals), geometric similarity, properties of right triangles, area of various plane regions, solid geometry, and an introduction to trigonometry. (Fall)

## **G-MA 201 Survey of Mathematics**

*3 hours*

A study of the philosophy, nature, significance and use of mathematics from early times to the present. Topics may include the use of graph theory to solve optimization problems in management science; conflict resolution using fair division; mathematical analysis of voting systems; applications of geometry to the size and shape of objects and to calculating inaccessible distances; geometric growth and decay; non-Euclidean geometry; number systems; logic; and probability and statistics. (Fall, odd years and Spring, odd years)

## **MA 211 Linear Algebra**

*3 hours*

An in-depth study of vectors, matrices and vector spaces. Includes systems of equations, eigenvectors and eigenvalues, linear independence, dimension and linear transformations. (Spring)

## **MA 212 Calculus III**

*4 hours*

Three-dimensional coordinate systems; vectors and vector-valued functions; partial derivatives; multiple integrals; vector calculus; second-order differential equations. Prerequisite: MA 112 Calculus II with a grade of C or better, or instructor approval. (Spring)

## **G-MA 221 Elementary Applied Statistics**

*4 hours*

A study of the principles of descriptive statistics, probability, sample and population relationships, estimation, and hypothesis testing. The computer is used as an aid in problem solving. (Fall and Spring)

**MA 311 Introduction to Analysis**

4 hours

Fundamental concepts of analysis, functions of bounded variation, integration, sequences of functions. Fourier series, functions of a complex variable. Prerequisite: MA 212. Also recommended: G-MA 123. (Fall)

**MA 342 Modern Geometry**

4 hours

A survey of selected topics in Euclidean geometry, projective geometry, non-Euclidean geometry, foundations of geometry and convex figures. Required for secondary education mathematics majors. Prerequisite: MA 112 Calculus II with a grade of C or better. (Spring, even years)

**MA 366 Differential Equations**

4 hours

Introduction to methods and applications of ordinary differential equations. Topics include first order differential equations and applications, higher order linear differential equations with applications, Laplace transforms and an introduction to numerical methods. Prerequisite: MA 112 Calculus II with a grade of C or better and MA 211 with a grade of C or better. (Fall, odd years)

**MA 375 Junior Seminar**

1 hour

A colloquium-type seminar. Junior mathematics majors prepare for an independent senior project in mathematics and select a project topic. (Fall)

**MA 411 Algebraic Structures**

4 hours

A survey of abstract algebra. Topics include bijections, projections, groups, rings, and fields. Prerequisite: MA 112 Calculus II with a grade of C or better (Spring, odd years)

**MA 441 Combinatorics and Graph Theory**

3 hours

A study of directed graphs, trees, circuits, paths, network flows, basic combinatorics, generating functions, difference equations. Emphasis on applications and on use of computer in problem solutions. Prerequisite: MA 112 Calculus II with a grade of C or better. (on demand)

**MA 462 Mathematical Theory of Statistics**

4 hours

The theory and proof of discrete and continuous statistical distributions, including probability mass functions, probability density functions, conditional distributions, independence of variables, joint distributions, and analysis of distributions of means. Prerequisite: MA 112 Calculus II or permission of instructor. Recommended: MA212 (Fall, odd years)

**MA 475 Senior Project**

2 hours (*Language Intensive*)

Students will investigate an advanced topic in a field of mathematics outside their classroom experience. Students will work in continual consultation with their research advisor. Regular informal oral and written updates of the project are required. The project culminates with a formally written project and a formal oral presentation of the project. (Spring)

**Special Course Options**

**295/495** Field Experience (1-4 hours)

**297** Study Abroad (12-16 hours)

**299/499** Independent Study (1-4 hours)

**388** Career Connections (3-10 hours)

**445** Readings and Research (1-4 hours)