MATHEMATICS (MAT)

MAT 100 Fundamental Mathematics (2 credits)
This course is designed to strengthen basic mathematical skills within problem-solving contexts. This course includes the real number system, basic arithmetic and algebraic operations, algebra, equations, inequalities, financial mathematics and geometry.
Course Rotation: NYC:Fall;Spring;Summer PLV:Fall;Spring

MAT 100C Fundamental Mathematics - (CAP) (2 credits)
This course is designed to strengthen basic mathematical skills within problem-solving contexts. This course includes the real number system, basic arithmetic and algebraic operations, algebra, equations, inequalities, financial mathematics and geometry.
Course Rotation: Fall, Spring.

MAT 100D Fundamental Mathematics (0 credits)
This course is designed to strengthen basic mathematical skills within problem-solving contexts. This course includes the real number system, basic arithmetic and algebraic operations, algebra, equations, inequalities, financial mathematics and geometry.
Course Rotation: TBA

MAT 100S Fundamental of Mathematics, Early Start Mathematics Program (0 credits)
Students will develop proficiency in arithmetic, including fractions, decimals and percent, and algebra, including solving linear equations and inequalities, the arithmetic of polynomials and rational expressions, and graphing lines. Particular focus will be on applied problems and translating word problems into algebra and solving. There is no credit or grades assigned in this course, but successful completion will give the student the opportunity to retake the Mathematics Placement Exam.
Course Rotation: Summer

MAT 102 Mathematics for Life (3-4 credits)
Investigation and applications of appropriate mathematical subject matter drawn from algebra, combinatorics and probability, logic, statistics, financial mathematics and geometry.
Course Rotation: Fall, Spring, Summer.

MAT 102A Math for Life: Integrated Review (0-3 credits)
Investigation and applications of appropriate mathematical subject matter drawn from algebra, combinatorics and probability, logic, statistics, financial mathematics and geometry.
Course Rotation: Fall, Spring, Summer.

MAT 102C Mathematics for Life - (CAP) (3 credits)
Investigation and applications of appropriate mathematical subject matter drawn from algebra, combinatorics and probability, logic, statistics, financial mathematics and geometry.
Course Rotation: NYC:Spring: PLV:Fall:Spring

MAT 102E Mathematics for Life - Learning Community (3 credits)
This paired learning community is geared for those whose majors do not require a specific math class and who would like to explore cultural issues in depth. These courses will examine stereotypes of gender, race, and class from ancient to modern times through the lens of mathematical studies. We will examine how these three categories intersect and become intertwined in social reality. How can math be used to describe and analyze those realities?
Prerequisites: MAT 100 or placement in course.

MAT 103 Algebra (0-3 credits)
Topics in algebra selected from properties of real numbers, simplification of algebraic expressions, factoring, exponents and radicals, equations, inequalities, logarithms, functions and their graphs, systems of linear equations, applications to business and the mathematics of finance. Note: Students may have this course waived as a prerequisite if their background warrants it. This waiver is usually determined by the Mathematics Placement Exam.
Course Rotation: NYC & PLV: Fall, Spring, and Summer.

MAT 103A Algebra - Arithmetic (3 credits)
Does not satisfy the core in Mathematics. The algebra content of this course is the same as MAT 103, Algebra, with the addition of foundational mathematics in the earlier part of the course. These additional topics include integers, fractions, decimals, percents, and proportions.
Course Rotation: Fall, Spring, Summer.

Prerequisites: Placement into course.

MAT 103AS Algebra -A (0 credits)
Does not satisfy the core in Mathematics. The algebra content of this course is the same as MAT 103, Algebra, with the addition of foundational mathematics in the earlier part of the course. These additional topics include integers, fractions, decimals, percents, and proportions.
Course Rotation: Fall, Spring, Summer.

Prerequisites: Placement into course.

MAT 103C Algebra-CAP (3 credits)
Topics in algebra selected from properties of real numbers, simplification of algebraic expressions, factoring, exponents and radicals, equations, inequalities, logarithms, functions and their graphs, systems of linear equations, applications to business and the mathematics of finance. Note: Students may have this course waived as a prerequisite if their background warrants it. This waiver is usually determined by the Mathematics Placement.

MAT 103D Algebra-Arithmetic (0 credits)
Does not satisfy the core in Mathematics. The algebra content of this course is the same as MAT 103, Algebra, with the addition of foundational mathematics in the earlier part of the course. These additional topics include integers, fractions, decimals, percents, and proportions.
Course Rotation: Fall, Spring, Summer.

Prerequisites: Placement into course.

MAT 103S Algebra, Early Start Mathematics Program (0 credits)
This course is identical in content to Math 103 but will be offered as a no credit/no fee course for incoming students in the Early Start Math Program. Course will not appear on students' transcripts. Successful completion will allow students to retake the Mathematics Placement Exam.
Course Rotation: Summer

MAT 104 Finite Mathematics (0-3 credits)
A brief review of algebra and its applications to business. Solutions to systems of linear equations and inequalities and their applications; introduction to matrix algebra and its applications. Foundations of finite probability, interpretations of probability, equally-likely outcomes, independent events, conditional probability, Bayes' theorem; Mathematics of finance and its applications.
Course Rotation: Fall, Spring and Summer.

MAT 104A Finite Mathematics: Integrated Review (3 credits)
A brief review of algebra and its applications to business. Solutions to systems of linear equations and inequalities and their applications; introduction to matrix algebra and its applications. Foundations of finite probability, interpretations of probability, equally#likely outcomes, independent events, conditional probability, Bayes' theorem; Mathematics of finance and its applications.
Course Rotation: NYC & PLV: Fall, Spring, & Summer

MAT 104C Finite Mathematics - (CAP) (3 credits)
Introduction to linear programming, the corner point and simplex methods for solving linear programs, foundations of finite probability, interpretations of probability, equally-likely outcomes, independent events, conditional probability, Bayes' theorem, and mathematics of finance.

MAT 109A Principles of Mathematics I (3 credits)
The course focuses on the structure of modern mathematics as it is used today. It emphasizes critical thinking, arithmetic algorithms, number systems, and problem solving. Topics include: strategies of problem solving, Boolean logic, sets, relations, functions, study of the integers, rational numbers, real numbers, and introduction to mathematical computer packages.
Course Rotation: Fall.

MAT 109B Principles of Mathematics II (3 credits)
This course is a continuation of themes of MAT 109A. Topics include the rudiments of probability, introduction to basic statistics, plane geometry, coordinate geometry, transformation geometry, measurement of plane figures, and the metric system.
Course Rotation: Spring.

MAT 111 Elementary Calculus I (3 credits)
Limits, continuity, derivatives of algebraic, exponential and logarithmic functions, optimization problems, introduction to integral calculus, fundamental theorem of integral calculus. Business and economic applications are stressed throughout.
Course Rotation: Fall, Spring, and Summer.

MAT 111S Elementary Calculus 1 - Learning Community (3 credits)
This course combines the beauty and fascination of astronomy with the logical reasoning and problem solving techniques of mathematics. Students will learn connections between science and mathematics and study real-world problem solving processes, as well as customary topics in both subjects. Students will interactively learn to use an astronomical telescope to take measurements and obtain a practical understanding of astronomy. Typical problems in astonomy will be presented to students who will then in turn learn to solve them in the mathematics portion of the course. Field trips: Hayden Planetarium. Field work: 6-8 sessions outside with telescopes.

MAT 117 Elementary Statistics (0-4 credits)
Collection, tabulation, and graphing of statistical data; measures of location and dispersion; sampling and sampling distributions; confidence intervals; hypothesis testing; correlation and regression. Business and economic applications are stressed throughout.
Course Rotation: Fall, Spring, and Summer.

MAT 125 Technical Math 1 (4 credits)
This course in technical mathematics covers topics in algebra and geometry. Topics include: functions and their graphs, trigonometry, base conversion, logarithms, and binary sequences. A brief review of numbers and basic algebra will lead to a further and more detailed exploration of the aforementioned topics.

MAT 130 Precalculus (4 credits)
Precalculus course for students who require additional mathematical background prior to taking MAT 131. Topics include logarithmic and exponential functions, trigonometric functions, trigonometric identities, solving triangles, conic sections, solving equations.
Course Rotation: Fall and Spring.

MAT 131 Calculus I (0-4 credits)
Analytic geometry, continuity, derivatives and differentials, applications to graphing and optimization problems, introduction to anti-differentiation and the definite integral.
Course Rotation: Fall, Spring, and Summer.

MAT 132 Calculus II (0-4 credits)
Applications of the definite integral, techniques of integration, indeterminate forms, improper integrals, Taylor's formula, infinite series.
Course Rotation: NYC: Fall and Spring. PLV: Fall, Spring, and Summer.

MAT 134 Introduction to Probability and Statistics (3 credits)
Introduction to the study of random processes; finite sample spaces, the role of assumptions in the formulation of probability models, probability models based on equally-likely outcomes, independent events, and conditional probability. Bayes' theorem, random variables, mathematical expectation; statistical applications of probability, introduction to sampling theory, confidence intervals and hypothesis testing.
Course Rotation: Fall, Spring and Summer.

MAT 137 Introduction to Discrete Mathematics (4 credits)
An introductory course in discrete mathematical structures. Selected topics chosen from set theory, number systems, logic and proofs, combinatorics and graphs, computer applications to real world problems.
Prerequisites: A grade of "C-" or better in MAT 103 or MAT 130 or placement into the course.

MAT 140 Statistical Programming for the Life Sciences (1 credits)
This course provides a non-calculus-based introduction to statistics, with a focus on applications in the life sciences: biology, environmental science, forensic science, and health care. This course focuses on the use of statistical programming software for students who have already received credit for a statistics course but require MAT141 for their major. The focus will be on the use of statistical programming for making graphics, making data files, sampling, describing data, contingency analysis, t-tests, ANOVA, correlation, and regression.
Course Rotation: NYC: Fall, Spring, & Summer

MAT 141 Introductory Statistics for the Life Sciences (4 credits)
This course provides a non-calculus based introduction to statistics, with a focus on applications in the life sciences: biology, chemistry and health care. Topics covered include data gathering, numerical and graphical data summaries, elementary probability, binomial, normal and sampling distributions, confidence intervals hypothesis testing, regression and correlation, analysis of variance, and nonparametric statistics. This course includes the use of technology.
Course Rotation: PLV:Fall;Spring

MAT 143 Introductory Statistics for the Social Sciences (4 credits)
This course focuses on those statistical methods that are relevant to the Social Sciences. A variety of applications related to this area are discussed. Statistical packages are introduced and utilized. Topics are chosen from both descriptive and inferential statistics.
Course Rotation: FALL;PLV

MAT 144 Introduction to Probability and Statistics for Economics (4 credits)
This course is an introduction to probability and statistics designed to illustrate applications to economics and business economics. Topics include: descriptive statistics, data collection, basic probability, Bayes' Theorem, sampling and sampling distributions; confidence intervals; hypothesis testing; correction and regression. Statistical software will be used as an integral part of this course.
Course Rotation: Fall; NY

MAT 218 Applied Regression Models (3-4 credits)
A thorough introduction of regression models, including simple and multiple regression models, model assumptions and diagnostics, variable selection and model building, nonlinear regression and generalized linear models.
Course Rotation: NYC & PLV: Fall & Spring

MAT 222 Applied Multivariable Statistical Methods (3 credits)
Review of single variable regression analysis; multiple regression models; multiple, partial, and multiple-partial correlations, analysis of variance, analysis of covariance, factor analysis, discriminant analysis; applications to management, and the social, biological and behavioral sciences.
Prerequisites: A grade of "C-" or better in MAT 116 or MAT 117 or MAT 134 or MAT 234

MAT 224 Topics in Applied Statistics (3 credits)

MAT 225 Bayesian Statistics and Modeling (3-4 credits)
MAT 225 will give a comprehensive introduction to Bayesian statistics. The three pillars of Bayesian statistics are Bayesian data analysis, multilevel models, and model comparison using information criteria. This course will discuss and demonstrate these topics with common sense and R. The focus is on using computation to realize the concepts, and applying Bayesian approach to your own research projects.
Course Rotation: NYC & PLV: Fall & Spring

MAT 233 Mathematical Structures and Models (4 credits)
The focus is on the central ideas of abstract postulate system, models of abstract postulate systems, and the mathematical model building process in connection with applications of mathematics to real world problems. Topics discussed include the nature of mathematical proof, consistency, independence of postulates, the role of assumptions in the model building process, number systems from ancient to modern times. Illustrations are chosen from the worlds of algebra and geometry.
Course Rotation: NYC: Fall.

Prerequisites: A grade of "C-" or better in MAT 111 or 131.

MAT 234 Introduction to Probability and Statistical Analysis (4 credits)
Probability on finite sample spaces, combinatorial methods, discrete random variables, probability distributions, probability generating functions, introduction to descriptive and inferential statistics, confidence intervals, hypothesis testing, regression, and correlation.
Course Rotation: Fall, Spring, and Summer.

MAT 236 Multivariable Calculus (4 credits)
Vectors, polar coordinates, functions of several variables, partial differentiation, multiple integration, applications, vector analysis.
Course Rotation: Fall.

Prerequisites: A grade of "C-" or better in MAT 132.

MAT 238 Linear Algebra (4 credits)
Vector spaces, matrix theory, linear transformations, rank, nullity, eigenvalues and eigenvectors.
Course Rotation: NYC: Spring. PLV: Fall.

Prerequisites: A grade of "C-" or better in MAT 132.

MAT 253 Differential Equations (4 credits)
Methods of solution of ordinary differential equations; the existence and nature of solutions; Linear differential equations; introduction to partial differential equations. Fourier series and boundary value problems; applications.
Course Rotation: PLV: Spring

Prerequisites: A minimum grade of "C-" or better in MAT 236 or permission of instructor.

MAT 256 Mathematical Structures for Computer Science (4 credits)
The focus is on mathematical structures that have applications to computer science. Topics chosen from algebra of sets; relations and functions; logic; elementary number theory; combinatorics; graph theory with applications to reach ability and path problems; introduction to group theory with applications to computer arithmetic and coding theory; related algorithms.
Course Rotation: NYC: Fall. PLV: Spring.

MAT 257 Mathematics of Finance (3 credits)
This course introduces the student to the theory and application of interest, especially in its impact on making logical financial decisions. Topics include: time value of money, equations of value, simple interest, compound interest, force of interest, analysis of single payment, irregular payment and annuity models with respect to both present and future value, internal rate of return, term of an investment, comparison of frequency of annuity payment to the frequency compounding, sinking fund, repayment of a mortgage and refinancing, valuation of a bond and depreciation.
Course Rotation: NYC: Spring - Even years.

Prerequisites: A grade of "C-" or better in MAT 111 or MAT 131.

MAT 260 History of Mathematics (3 credits)
This course will provide students with an opportunity to explore selected topics in the history of mathematics. Students will explore mathematical contributions from people of diverse cultures with accomplishments from both female and male mathematicians. Topics include mathematics in ancient Egypt, ancient Mesopotamia, ancient Greece, the Roman Empire, the Pre-Columbian Americas, the Islamic World, China, and India. The development of mathematics from ancient times, the Middle Ages, and throughout the 17th to 21st Centuries will be examined. The lives and contributions of individual mathematicians will be explored.

MAT 296 Topics in Mathematics (1-6 credits)
This course will treat at different times at an intermediate level one or more such topics as mathematical logic, number theory, actuarial mathematics, optimization techniques, and applied mathematics in various fields. With permission it may be taken more than once for credit.
Course Rotation: TBA.

MAT 296H Mathematics Research Capstone With Real Analysis (4 credits)
This senior capstone experience in mathematics is designed to provide mathematics majors with an integrative experience in the subject. It explores connections among the sub-disciplines of mathematics with particular focus on Real Analysis and their relation to other academic areas and applications. Real analysis topics a selection from the following: Rigorous treatment of the real number system, limits, continuity, uniform continuity, differentiability of functions of one real variable, the Riemann integral, introduction to point set topology, sequences of functions, uniform convergence. Students are required to complete a research project and present their findings. Class members engage in peer review of presentations. Campus: PLV. Rotation: Fall

MAT 296I Learning Math with a Global Perspective: Greece (3 credits)
This course is designed to strengthen basic mathematical skills within problem-solving contexts. On the completion of this course students should be competent with fractions, decimals, ratios and proportions, percents, signed numbers, triangles, logic, probability, and functions. The goal of this course is to improve the student's mathematical reasoning ability. Students will be able to apply appropriate mathematical operations to a variety of situations. The course will reinforce critical thinking skills in quantitative contexts. Students will gain cultural competencies in math and teaching as they relate to Greek culture and history.
Course Rotation: Spring & Fall

MAT 301 Algebraic Structures (3 credits)
A study of groups, rings, fields, sub and quotient structures, homomorphisms, and the role of algebra in applications.

MAT 303 Modern Geometry (3 credits)
Geometry from Euclidean to present day. Axiomatic approach to Euclidean geometry, deficiencies in conventional geometry, finite geometry, non-Euclidean geometry, and projective geometry.
Course Rotation: PLV: Spring - Odd years.

MAT 305 Complex Variables (3 credits)
Algebra of the complex number system, analyticity, Cauchy-Riemann equations, integration, Cauchy's integral theorems, infinite series, Taylor and Laurent expansions, residues, insolated singularities, conformal mapping.
Course Rotation: NYC: Fall - Even years. PLV: Fall - Odd years.

Prerequisites: A grade of "C-" or better in MAT 236, or permission of Department Chair.

MAT 311 Real Analysis (3 credits)
Rigorous treatment of the real number system, limits, continuity, uniform continuity, differentiability of functions of one real variable, the Riemann integral, introduction to point set topology, sequences of functions, uniform convergence.
Course Rotation: NYC: Fall - Odd years. PLV: Fall - Even years.

MAT 315 Introduction to Real and Complex Analysis (4 credits)
The course is designed as a post-calculus course addressed to students majoring in mathematics or mathematics education and pays special attention to developing the student's ability to read and write proofs. The course covers the concepts of the real and complex numbers system, introduction to point set topology, limits, continuity, uniform continuity, differentiation and integration, sequences and series of real and complex functions. It will provide the mathematically mature and motivated undergraduate students with a solid background for further studies, deepen their understanding of calculus, and provide sound training in rigorous mathematical proof.
Course Rotation: NYC & PLV: Spring

MAT 390 Honors Project in Mathematics (3 credits)

MAT 391 Mathematics Internship I (3 credits)
A direct experience in the working environment, intended to provide the student with a practical extention and enhancement of knowledge gained in class. The student has an assignment and is directed by professionals in the normal working environment. The student must also report to and consult with his or her faculty advisor who provides overall academic supervision.
Course Rotation: TBA.

Prerequisites: Completion of sophomore year, recommendation of Department Chair and acceptance in a position.

MAT 395 Independent Study in Mathematics (1-9 credits)
With the approval of the appropriate faculty member, the department chairperson and the academic dean, students may select a topic for guided research that is not included in the regular course offerings. The student meets regularly with the faculty member to review progress. A research project or paper must also be submitted.
Course Rotation: TBA.

Prerequisites: Junior standing and a minimum QPA of 3.00.

MAT 400 Mathematics: Connections, Communications, Research (3 credits)
This senior capstone experience in mathematics is designed to provide mathematics majors with an integrative experience in the subject. It explores connections among the sub-disciplines of mathematics and their relation to other academic areas and applications. Students are required to complete a research project and present their findings. Class members engage in peer review of presentations.
Course Rotation: PL: Fall.

Prerequisites: MAT 234 and MAT 236 and MAT 238, and senior standing or permission of instructor

MAT 490 Mathematics Seminar Capstone Experience I (1 credits)
Students will attend the six seminars given in a semester and report on the talks.
Course Rotation: NY: Fall.

Prerequisites: Restricted to Mathematics majors. Senior Standing. MAT 137 or MAT 233 and MAT 234 and MAT 236 or permission of instructor.

MAT 491 Mathematics Seminar Capstone Experience II (2 credits)
The Senior Year Capstone Experience consists of two semesters of seminars together with an associated project which, when combined, serve as an integrative experience for mathematics majors as well as a tool for departmental faculty to evaluate the extent to which students have mastered the materials and tools covered in the first three years of their undergraduate education. Moreover, it serves to hone their study and presentation skills as well as their ability to critique the work of others. This class will continue the seminars of Math 490 but will also require student to write and present a more extensive research project.
Course Rotation: NYC: Spring

Prerequisites: MAT 490. Restricted to Mathematics majors. Senior Standing Required or permission of instructor.