

# MATH: MATHEMATICS

## MATH 1000 College Mathematics (4 Credits)

This course provides students with the opportunity to strengthen college mathematics skills prior to enrollment in more advanced courses.

The student will have the opportunity to further develop the skills and confidence needed to be successful in other courses that require college-level quantitative skills, including statistics. Topics include employing quantitative methods to solve problems, determining the reasonableness of results, and recognizing the limits of mathematical methods. Fluency with the use of integers, rational numbers, exponents, expressions, equations, inequalities, inductive and deductive reasoning, algebraic problem solving, graphs, geometry, measurement, and the use of probability and statistics will be furthered. Notes: This course overlaps with algebra. A student should seriously consider which course is appropriate, depending on math background, comfort and goals. This study is appropriate for students who need general education credit in mathematics.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

## MATH 1005 Contemporary Mathematics (4 Credits)

This study explores the exciting world of mathematics through such diverse topics as working with investing models, geometry, characterizing change and statistics. Foundational studies, including algebra, are also included, but not as extensively as in a full algebra course. Note: This study is appropriate for students needing to meet the general education requirement. This course was previously SMT-271954 Contemporary Mathematics.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

## MATH 1010 Discovering Math Across Generations (4 Credits)

Interested in helping children with math? Would you like to convey mathematical concepts through creative home projects? Do you have the numerical skills to understand and communicate quantitative concepts? This course presents mathematics materials for families to learn and enjoy mathematics. An interactive approach helps adults use topics in algebra, geometry, number sense, estimation, logical thinking, probability and statistics with other family members and children. This course is designed for interaction with children between the ages of 6 and 12. Highly Recommended (not required): Since the course is designed around this interaction, access to a child of this age is highly recommended. Notes: This study is appropriate for students who need general education credit in mathematics. This course was previously SMT-271604 Discovering Math Across Generations.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

## MATH 1015 Math for the Inquiring Mind (4 Credits)

The focus of this course is on developing mathematical problem solving as a process of identifying, defining, and understanding a mathematical problem; and then modeling, validating, and documenting its solution. Students will improve and refine problem-solving skills, including analytical and critical thinking, and quantitative reasoning as they apply to real-life mathematical problems. Learners will also use a learning journal throughout the course as a strategy for reflection and self-assessment. The course includes the use of tables, data management and analysis, graphical analysis, and modeling. A spreadsheet (preferably Excel) will be used extensively as a problem-solving tool. Note: This study is appropriate for students who need general education credit in mathematics. This course was previously SMT-271854

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

## MATH 1020 Voter Math (3 Credits)

Voter Math examines the mathematics of elections while building mathematical understanding. Topics include: the use of a spreadsheet; statistical tools; the use of polls and surveys; voting algorithms (methods); fairness criteria; power distribution in voting; and apportionment of seats in legislatures. Through problem solving with Excel, students will gain confidence in the use of basic math skills, such as fractions, decimals, percentages, simple equations and formulas. They will expand their skills to include statistical tools, creation and interpretation of graphs, more advanced use of equations and formulas, calculation of power indices, and various vote tallying methods. Note: This study is appropriate for students who need general education credit in mathematics. For students who need additional support using Excel, a list of available video tutorials will be made available. This course was previously SMT-271203.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

## MATH 1025 Quantitative Reasoning (4 Credits)

This study will develop the ability to interpret and reason with information that involves mathematical ideas and numbers. As students explore issues that directly affect their lives, they will gain an appreciation of mathematics and its importance in a technological world. Topics include statistical reasoning, financial management, mathematical modeling, probability, and geometry. Note: This study is intended for students who need general education credit in mathematics.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

## MATH 1030 Visualizing Mathematics (4 Credits)

Are you a visual learner? This course will give an opportunity to learn mathematics primarily through seeing it. Focus will be on topics in geometry, which are naturally visual, and graphing, which will give an understanding of the visual aspect of algebra. The course will also look at mathematics through art. DVDs and text materials will be used, along with internet resources. Note: This study is appropriate for students who need general education credit in mathematics. This course was previously SMT-271514 Visualizing Mathematics.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

## MATH 1040 Algebra (3,4 Credits)

This study will develop basic algebra concepts and problem solving techniques. The student will develop skills in translating problem situations into their symbolic representations and manipulating those symbols. Major topics include equations, inequalities, problem solving, geometry, graphs, and transformations. Linear, quadratic, polynomial, exponential, and logarithmic functions will be studied. Note: This study is appropriate for students who need general education credit in mathematics. Prerequisite: Understanding of arithmetic essentials. This course was previously SMT-271104 Algebra.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

## MATH 1050 Mathematics for Business (4 Credits)

Mathematics for Business presents math skills and knowledge that can be applied in solving financial problems. The core topics include business finance, trade and cash discounts, markup and markdown, business statistics, wages and payroll, simple interest and simple discount, compound interest, future value, and present value, mortgages, sinking funds, and amortization, depreciation, inventory, insurance, business insurance, life insurance, annuities, taxes, stocks and bonds. Students will also gain an understanding of financial instruments and terminology used in business finance. This serves as a foundation for further studies in business, management, accounting, and finance. Students will gain skills to manage personal finance. Note: This study is appropriate for students who need general education credit in mathematics.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 1055 Mathematics for Elementary Teachers (4 Credits)**

This course is intended for students who are interested in teaching at the elementary school level. Elementary mathematics material will be presented from a variety of perspectives so that the student will be more able to address the broad range of learning aptitudes that he/she will encounter in their future students. Topics will include a development of binary algorithms, properties of the real number system as applied to different mathematical systems, systems of numeration, functions and equivalence relations and solving algebraic equations and number theory.

**Attributes:** Liberal

**MATH 1060 Introduction to Statistics (3 Credits)**

The student will study introductory statistics in order to be able to interpret, evaluate, and use statistical information and methods. The student will work standard problems in statistical analysis involving measures of central tendency, measures of dispersion, confidence intervals, hypothesis testing, and correlation and regression. The student will also interpret the results of statistical analysis and present and evaluate statistical information in graphical form. Note: This course can be paired with Statistics II. It should not be taken with Statistics (4 credits), since there is considerable overlap.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 1065 Statistics (3-4 Credits)**

The focus of this course is on the application and use of statistics, rather than the detailed complexity of the underlying mathematics. Students will study and apply the fundamental concepts and methods of data analysis, including both descriptive and inferential statistics, including arranging data, tables and graphs, measures of central tendency and dispersion, regression analysis, correlation, sampling, confidence intervals, and hypothesis testing. The student will make use of technology-based tools (Excel, StatCrunch, etc.) to assist in summarizing, interpreting, and communicating with data. Notes: This study is appropriate for students who need general education credit in mathematics. Algebra would provide a good background for statistics, although the minimum entering skills would be arithmetic essentials (fractions, decimals, ratios) and graphing. This course was previously SMT-272384 Statistics: An Activity Based Approach.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 1100 Introduction to Discrete Mathematics (4 Credits)**

This course is designed to develop mathematical thinking at an abstract level, starting from a modest background in mathematical algorithmic knowledge. It includes the basic ideas of logic, proofs and mathematical induction; set theory; an understanding of the concept of function in set theoretic terms; equivalence relations and graphs. Notes: Recommended for students who lack the math background for an advanced level study of this subject. This study is appropriate for students who need general education credit in mathematics. Prerequisites: MATH 1040 Algebra.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 1110 Geometry (4 Credits)**

This course covers the important principles and real-world applications of geometry. Topics covered include line and angle relationships, parallel lines, triangles, quadrilaterals, similar triangles, circles, locus and concurrence, areas of polygons and circles, surfaces and solids, and analytic geometry. Notes: This study is designed for students who wish to expand their learning in geometry, including non-Euclidian geometry. This study is appropriate for students who need general education credit in mathematics.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 1122 Math for Paraprofessionals (3 Credits)**

In this course, paraprofessionals will study elementary concepts of sets, numeration systems, number theory, and properties of the natural numbers, integers, rational, and real number systems. There will be an emphasis on problem solving and critical thinking pertaining to understanding and explaining the concepts. All readings and learning activities for the study are taken from the Mathematics For Elementary Teachers by Michelle Manes: Creative Commons. (<http://pressbooks-dev.oer.hawaii.edu/math111/>)

**Attributes:** Mathematics Gen Ed

**MATH 1140 Precalculus (4 Credits)**

Students learn the foundational concepts needed to prepare for further studies in mathematics and its applications. Topics covered will include: precise and correct usage of mathematical terminology, sets, functions and their inverses, rational functions, linear, quadratic, cubic and quartic equations, trigonometry, exponential and logarithmic functions, complex numbers, graphing, and solving word problems. Other topics may include the introduction of conic sections, polar coordinates and parametric equations. This course was previously SMT-271204 Precalculus: Fundamentals of Mathematics. Notes: The primary audience for this study consists of students who are planning further studies in Mathematics, related fields, IS/IT, or Business Prerequisites: Algebra MATH 1040.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 1145 Introduction to Calculus (3 Credits)**

In this study, students will apply the basic principles of calculus, including limits, slopes, and tangents. In addition, students will begin to explore derivatives and integrals. Notes: This study is intended to be a one-term introduction to calculus for students who do not need to complete two or three terms in calculus. It will prepare the student for further study in technology, science, or mathematical applications in other fields. This study is appropriate for students who need general education credit in mathematics. This course is meant as a stand-alone and will not be sufficient preparation for Calculus 2. If you are preparing for the Calculus sequence, (Calculus 1, 2, 3), you should not take this course. Prerequisites: MATH 1040 Algebra.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 1150 Calculus for Business (4 Credits)**

Calculus for Business is a study of functions, limits and derivatives. It is designed to improve understanding of the way that variables such as supply and demand interact with each other. Business applications include the study of marginal rates for profit and revenue using derivatives, and the use of exponents and logarithms in the calculation of compound interest. Integration is viewed as a summation over continuous time or space. Notes: This study is appropriate for students who need general education credit in mathematics. Calculus for Business and Calculus I cannot both be taken for credit. Student should have a current knowledge of Algebra prior to taking this course.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 1998 Individualized Studies in Mathematics (MATH) (1-8 Credits)**

Students have the opportunity to develop individualized studies with their mentor in Mathematics (MATH). Registration for this class must be approved by the student's mentor.

**MATH 2005 History of Mathematics: Introductory (4 Credits)**

This interdisciplinary course offers an introduction to the development of mathematics from antiquity to the present. Moving beyond an outline of the development of mathematical ideas in Europe and its colonies, students will also study mathematical developments in other cultures, including the ancient Mesopotamian, Chinese, Indian and Egyptian civilizations. Emphasis will be placed on mathematical developments in broader historical and cultural context. Students will discuss points of view concerning selected core controversies in mathematics, research and write about the contributions of individuals or cultural groups to the development of mathematics, and solve a variety of mathematical problems of historical interest. Note: This study is appropriate for students who need general education credit in mathematics. This course was previously SMT-272904 History of Mathematics.

**Attributes:** Mathematics Gen Ed, Other World Civilization Gn Ed, \*Mathematics Gen Ed, \*World Hist & Glb Awncs Gen Ed, Liberal

**MATH 2010 Introduction to Proof & Logic (4 Credits)**

Logic, the science of cogent inference, is at the foundation of all mathematical reasoning. Moreover, logic is an essential underpinning for many other fields which rely on analytical reasoning. This multidisciplinary study offers an introduction to formal logic and methods of proof. A particular emphasis will be placed on clear exposition in proof-writing, strategies in the construction of mathematical proofs, and critical reflection on proof composition and methodology. Highly Recommended (not required): Prior to enrolling in this course, a student should have a working knowledge of mathematical notation and terminology. At least two semesters of undergraduate mathematics is strongly recommended, with one of these being at a minimum Precalculus or higher. Notes: This study is intended to facilitate the transition to studies in advanced-level undergraduate mathematics. This course was previously SMT-272164 Introduction to Proof and Logic.

**Attributes:** Liberal

**MATH 2015 Mathematics for Game Programmers (4 Credits)**

Mathematics for Game Programmers develops math skills and knowledge needed to be applied to game programming. The core topics include points and lines, parabolas, circles and spheres, trigonometric functions, vector operations, matrix operations, and transformations. The study serves as a good foundation for further study in computer programming. This study is appropriate for students who need general education credit in mathematics. Prerequisites: MATH 1040 Algebra.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 2065 Statistics II (3 Credits)**

In this study, students will continue the exploration of statistics in order to be able to interpret, evaluate, and use statistical information and methods. The student will briefly review introductory statistics. Then, the student will solve problems using statistical analysis involving hypothesis testing, multiple regression, applications of the Chi-Square distribution, and analysis of variance (ANOVA). The student will also be able to interpret the results of statistical analysis and be able to present and evaluate statistical information. This study is appropriate for students who need general education credit in mathematics. Prerequisites: Introduction to Statistics MATH 1060 or Statistics MATH 1065.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 2140 Calculus I (4 Credits)**

Topics found in Calculus I include solving problems pertaining to functions, limits, continuity, derivatives, implicit differentiation, related rates, maxima and minima. Students also begin to study definite integrals with applications to area and volumes of revolution. Notes: This is the first in a three-course Calculus sequence. This course was previously SMT-272104 Calculus 1. Prerequisites: Precalculus MATH 1140.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 2141 Calculus II (4 Credits)**

In Calculus II, students will study techniques and applications of integration, elementary transcendental functions, polar coordinates, parametric equations, infinite sequences and series, vector functions, and curves in space. Prerequisite (must complete before registering): Calculus I Notes: This is the second course in a three-course sequence. There may be some variation in topics covered. This course was previously SMT-272144 Calculus 2.

**Attributes:** Liberal

**MATH 2998 Individualized Studies in Mathematics (MATH) (1-8 Credits)**

Students have the opportunity to develop individualized studies with their mentor in Mathematics (MATH). Registration for this class must be approved by the student's mentor.

**MATH 3000 Exploring the Disciplines: Thinking Mathematically (2 Credits)**

Use this course in conjunction with educational planning to both learn more about what a degree in mathematics means, as well as experience the world of theoretical mathematics. Students also explore the use of Maple software. Ideally, this is taken before or concurrently with any advanced level math course. Prerequisites: Some math background is needed, but actual content will vary. This course was previously EDU-233032. This course may be used to fulfill educational planning credit with mentor approval.

**Attributes:** Liberal

**MATH 3005 History of Mathematics: Advanced (4 Credits)**

This interdisciplinary course offers an advanced-level introduction to the development of mathematics from antiquity to the present. Moving beyond the development of mathematical ideas in Europe and its colonies, students will also study mathematical developments in other cultures, including the ancient Mesopotamian, Chinese, Indian and Egyptian civilizations. Students will propose a course theme in accordance with their particular interests around which to build their principal research and writing assignments. Students will be encouraged to identify significant mathematical developments, to analyze key ideas, contributors and events that made these possible, and to discuss implications for mathematics in the 21st century. Prerequisite (must complete before registering): Precalculus Highly Recommended (not required): This advanced-level study presumes that the student has already achieved upper-level standing with fluency in college reading, writing, research and critical thinking. This study also presumes that the student has excellent knowledge of college level mathematics through Precalculus. Notes: This study is appropriate for students who need general education credit in mathematics. There is an introductory version of this course (MATH 2005) in which students who may not yet be prepared for advanced-level studies are encouraged to enroll. This course was previously SMT-273904 History of Mathematics.

**Attributes:** Mathematics Gen Ed, Other World Civilization Gn Ed, \*Mathematics Gen Ed, \*World Hist & Glb Awncs Gen Ed, Liberal

**MATH 3010 Linear Algebra (4 Credits)**

This study examines linear equations, matrices, and determinants. This foundational knowledge leads to a detailed study of real vector spaces, including linear independence, basis, dimension, and orthogonality. Following an exploration of eigenvalues and eigenvectors, the study will culminate in an exploration of linear transformations, which are the multidimensional generalization of the familiar linear functions. Prerequisite (must complete before registering): Calculus III This course was previously SMT-273014.

**Attributes:** Liberal

**MATH 3015 Discrete Mathematics (4 Credits)**

This course explores the precise foundational mathematical concepts that underlie much of computer science and advanced studies in mathematics. Topics include formal symbolic logic, an introduction to deductive proof, set theory, relations, functions, partial orders, induction, recursion, principles of counting, algorithms, complexity, and introductory concepts in graph theory. Prerequisites (must complete before registering): Excellent algebraic skills and working knowledge of mathematical notation and terminology. Highly Recommended (not required): At least two semesters of undergraduate mathematics, with one of these being at a minimum Pre-Calculus or higher. Note: Students who wish to concentrate in mathematics, applied mathematics, or related fields such as computer science, information systems, or information technology are most likely to take this course. This course was previously SMT-273104.

**Attributes:** Liberal

**MATH 3020 Graph Theory (4 Credits)**

Topics covered in this course include: graphs as models, paths, cycles, directed graphs, trees, spanning trees, matchings (including stable matchings, the stable marriage problem and the medical school residency matching program), network flows, and graph coloring (including scheduling applications). Students will explore theoretical network models, such as random graphs, small world models and scale-free networks, as well as networked datasets from social, infrastructure and information networks, the role of strong and weak ties, triadic closure, and centrality measures, as well as the fragility of networked systems and contagious process on networks of various topologies. Prerequisites: Discrete Math Foundations of mathematics and mathematical proof: logic, methods of proof (both inductive and deductive), sets, relations and functions. This knowledge may be obtained from a course such as Discrete Mathematics, for example. This course was previously SMT-273244.

**Attributes:** Liberal

**MATH 3025 Math Modeling (4 Credits)**

Mathematical Modeling looks at the world in a numerical way to gain a better understanding of how things work and interrelate. The focus of this course will be on patterns of growth. There are countless examples that will allow the course to include new or newsworthy problems each term. When will an outbreak of a disease become an epidemic? Which investment strategies give the best return? When does a species, such as the spotted owl of the great Northwest, decline to a point that it is doomed to extinction? When is a problem too big to be solved by a computer? Prerequisites: Calculus I, Statistics Calculus II recommended prior to enrolling in Math Modeling. This course was previously SMT-273504.

**Attributes:** Liberal

**MATH 3040 Calculus III (4 Credits)**

This is the third in a three-course Calculus sequence. Topics found in Calculus III include functions of several variables, partial derivatives, directional derivatives, maxima and minima of functions of several variables, line integrals, surface integrals, divergence, curl, Green's Theorem, Stokes' Theorem, and applications of double and triple integrals. Prerequisite (must complete before registering): Calculus II Note: Since this course is part of a sequence, the content of Calculus III may differ depending on what was offered in Calculus II. If at all possible, a sequence that follows the same book is the preferred approach. This course was previously SMT-273144 Calculus 3.

**Attributes:** Liberal

**MATH 3045 Mathematical Proofs (4 Credits)**

Advanced mathematics requires creativity in analyzing why theorems are correct, reading their proofs, and creating proofs for additional theorems. This study is designed to provide the tools to analyze proofs and to present the advanced concepts in accord with mathematical conventions. The study includes sentential logic, logic of quantifiers, proof strategies, biconditionals, existence and uniqueness proofs, relations, functions and inductive proofs. This study is appropriate for students who need general education credit in mathematics.

Prerequisites: Discrete Math MATH 3015.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 3050 Applied Probability & Statistics (4 Credits)**

This study provides the mathematical foundations of both statistics and probability. Topics include: review of descriptive and basic inferential statistics and basic probability, random variables, probability distributions (Poisson distribution, normal distribution, geometric distribution, the negative binomial distribution and the gamma distribution) parameter estimation, goodness of fit tests, regression analysis and basic quality control methods. Note: This study is appropriate for students who need general education credit in mathematics.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 3055 Numerical Methods (4 Credits)**

This course explores develops a variety of skills involving mathematical preliminaries and error analysis, direct methods for solving linear systems, interpolation and polynomial approximation, numerical integration and differentiation, and solutions of equations of one variable. This course is highly computational and many of the concepts require a deeper understanding of the theory presented. Prerequisites: Calculus II Familiarity with linear algebra and programming recommended. This course was previously SMT-273344.

**Attributes:** Liberal

**MATH 3060 Mathematical Statistics (4 Credits)**

In this upper level calculus-based probability and statistics course, students will study topics including descriptive statistics, probability models and related concepts and applications, statistical estimation, and hypothesis testing. Prerequisites (must complete before registering): Calculus II This course was previously SMT-273114.

**Attributes:** Liberal

**MATH 3065 Ordinary Differential Equations (4 Credits)**

This upper-level course provides an exploration of the theory, solution, and application of ordinary differential equations. Concepts learned include methods of solving first-order differential equations, higher-order differential equations, modeling with first-order and higher-order differential equations, series solution of linear equations, systems of linear first order differential equations, and numerical solutions of ordinary differential equations. Students will apply differential equations in physics, biology, and economics. Prerequisite (must complete before registering): Calculus III This course was previously SMT-274104.

**Attributes:** Liberal

**MATH 3998 Individualized Studies in Mathematics (MATH) (1-8 Credits)**

Students have the opportunity to develop individualized studies with their mentor in Mathematics (MATH). Registration for this class must be approved by the student's mentor.

**MATH 4005 Number Theory (4 Credits)**

In this upper-level mathematics course students will apply the concepts of number theory. This will take place through numerical calculations, reading and writing of proofs, and discussion. Students will explore the properties of integers and their applications, including topics in the history of number representation systems, divisibility, prime numbers, linear Diophantine equations, Fermat's last theorem, cryptology, and public key encryption. Prerequisites (must complete before registering): Intro to Proof and Logic Note: Foundation in reading and writing of proofs is necessary. This course was previously SMT-274314.

**Attributes:** Liberal

**MATH 4010 Abstract Algebra I: Group Theory (4 Credits)**

In this upper level study, students explore the theory and applications of the algebraic structures known as groups. In addition, group theory will be used to develop the skill in proofs and abstraction that are essential to further study of higher mathematics. Topics covered in this course include: an introduction to the abstract idea of a group; example groups; subgroups and cyclic subgroups; permutations and Cayley's Theorem; cosets, normal groups and their relationship to homomorphisms; and Lagrange's Theorem. Prerequisites: It is assumed that students are acquainted with logic and the construction of proofs, usually from having completed a study in at least two out of three of the following topics: Discrete Math, Proofs, and Linear Algebra. Relevant topics from those courses are logic, proofs, if and only if proofs, proof by induction, equivalence relations, properties of functions such as one to one and onto, and matrix operations. These topics will be used extensively. This course was previously SMT-274404 Abstract Algebra 1: Group Theory.

**Attributes:** Liberal

**MATH 4011 Abstract Algebra II (4 Credits)**

This study focuses on rings, integral domains and fields. It is designed to expand knowledge of the building of theoretical structures based on axioms, and to build an understanding of how these constructs are more general versions of algebra learned earlier. Prerequisites: Abstract Algebra I.

**Attributes:** Liberal

**MATH 4020 Quantitative Methods for Management (4 Credits)**

Explore quantitative methods and techniques for decision support in a management environment, using mathematical models. The course includes formal project management tools and techniques, such as linear programming; use of time series analysis for forecasting; applications of regression analysis in management; and aspects of decision theory and simple modeling. Complete a final project, applying one or more of these techniques in an area of interest. Notes: Excel spreadsheet software is used extensively in course assignments. This course meets the quantitative guideline in BME degrees. This course was previously SMT-214104 Quantitative Methods for Management.

**Attributes:** Mathematics Gen Ed, \*Mathematics Gen Ed, Liberal

**MATH 4025 Complex Variables (4 Credits)**

The theory of complex variables is elegant and rich in applications. Also known as Complex Analysis, this is primarily a proof-based study of functions of a single complex variable. Complex variables enjoy a wide range of applications, which appear in engineering and the physical sciences. Complex Analysis also applies elegantly to other sub-fields of mathematics, such as Number Theory and Partial Differential Equations. Prerequisites: Introduction to Proof and Logic and Calculus III. This course was previously SMT-273314.

**Attributes:** Liberal

**MATH 4030 Real Analysis (4 Credits)**

This course is an exploration of the theory of calculus of functions of a single real variable. Students will establish calculus on a rigorous foundation: familiar concepts will be revisited in the context of mathematical proof. Topics include: the real numbers, limits of sequences, completeness, the Monotone Convergence Theorem, the Bolzano-Weierstrass Theorem, the Cauchy Criterion, the Cantor Set, open and closed sets, sequential compactness, limits of functions, continuity, the Intermediate Value Theorem, the derivative, the Mean Value Theorem, the Riemann Integral, and the Fundamental Theorem of Calculus. Prerequisites (must complete before registering): Calculus III and one of the following: Intro to Proof and Logic, Discrete Mathematics or Linear Algebra This course was previously SMT-274344 Real Analysis: The Theory of Calculus.

**Attributes:** Liberal

**MATH 4998 Individualized Studies in Mathematics (MATH) (1-8 Credits)**

Students have the opportunity to develop individualized studies with their mentor in Mathematics (MATH). Registration for this class must be approved by the student's mentor.