

MATHEMATICS

College of Natural and Behavioral Sciences
Department of Mathematics

Program Description

Mathematics is about number operations and algebra, motion and change (calculus and differential equations), logical analysis, scientific visualization, structure and geometry, the prediction of random events (probability), the extraction of useful information from large sets of data (statistics), the discovery of the best ways to do things (optimization). It is abstract and theoretical, and intensely down-to-earth and practical, all at the same time.

The mathematics major and minor prepare students for exciting and rewarding work in industry, for careers in teaching, and for advanced post-baccalaureate study. Our calculus, differential equations, analysis, and probability and statistics courses enable science students to analyze data and predict outcomes in static and dynamic situations.

Our foundations, discrete math, and algebra courses give students the tools they need for rigorous logical and structural analysis and a deep conceptual understanding of quantitative situations. Our mathematics education courses prepare students to be outstanding teacher leaders with a deep knowledge of mathematics and the best practices in teaching. Our general education courses give the general student the mathematical background she or he needs to function in life as an educated and informed citizen in an increasingly quantitative and data-driven world.

The Mathematics Department makes every effort to offer its courses at times that are convenient for students.

For additional information, please visit our website <http://math.csudh.edu/> (<http://math.csudh.edu/>).

Academic Advising

Students are welcome to see a math advisor at any time when faculty are available. All full-time math faculty serve as advisors. Please call the Math department office (310) 243-3378 or drop by NSM A-124 during regular business hours to schedule an appointment with an advisor. The math department requires majors to meet with an advisor at least once each semester.

Preparation

High School students should complete Algebra II, a year of geometry and trigonometry. A mathematics course should be taken in the senior year. Transfer students should complete three semesters of calculus and one additional course if possible.

Graduation With Honors

An undergraduate student may graduate with Honors in Mathematics provided that the following criteria are met:

1. A minimum of 36 units in residence at CSU Dominguez Hills;
2. A minimum grade point average of at least 3.5 in all courses used to satisfy the upper-division requirements in the major;
3. Recommendation by the faculty of the Mathematics Department.

Career Opportunities

A degree in mathematics is a key that opens the door to a world of opportunity. Students who major in mathematics are able to pursue a diverse range of careers. They are sought out by profit and non-profit institutions for their ability to use reasoning and logic and for their ability to solve problems. Many are interested in passing their learning on to future generations through teaching. Others seek advanced degrees in mathematics or other sciences and pursue cutting-edge research. Some will pursue degrees in business or economics, where the ability to work with numbers can be a great advantage. Those with mathematical training have gone on to careers as business executives at major software companies, as analysts for stock trading companies, as actuaries and risk management experts for insurance companies and the healthcare industry, as scientists and data analysts in engineering and biotech firms, as software designers and programmers, and a whole host of other careers.

Undergraduate Programs

Bachelor

- Mathematics, Bachelor of Science (<https://catalog.csudh.edu/academics/mathematics/mathematics-bs/>)

Minor

- Mathematics, Minor (<https://catalog.csudh.edu/academics/mathematics/mathematics-minor/>)

Graduate Programs

Subject Matter Authorization

- Introductory Mathematics, Subject Matter Authorization (<https://catalog.csudh.edu/academics/mathematics/introductory-mathematics-subject-matter-authorization/>)

Faculty

Matthew Jones, Department Chair

Jessalyn Bolkema, Alex Chen, Sharon Lanaghan, Ha Nguyen, Wai Yan Pong, Serban

Raianu, Cynthia Sanchez-Tapia, Kristen Stagg, Alexander Stanoyevitch, Yi Wang, Carolyn Yarnall

Department Office: NSM A-115, (310) 243-3378

Website: math.csudh.edu (<http://math.csudh.edu/>) (<http://math.csudh.edu/>) (<http://math.csudh.edu/>)

Center for Science and Mathematics Education NSM A-115, (310) 243-2203

Emeritus Faculty

Jacqueline Barab, Frederic Brulois, Chi-lung Chang, William Gould, Garry Hart, Jackson Henry, George Jennings, Eunice Krinsky, Frank Miles, John Wilkins

Courses

MAT 100. Calculus Success Academy. (2 Units)

Preparation for MAT 103, MAT 153, and MAT 191. Students will strengthen their problem solving and algebra skills while working collaboratively on math problems arising from various STEM disciplines. For students majoring in Biochemistry, Chemistry, Computer Science, Mathematics and Physics.
Offered All terms, Spring, Summer

MAT 102. Foundations of Statistics. (3 Units)

Preparation for MAT 105 or MAT 132. Fundamental mathematical and statistical reasoning, including linear functions, measures of center and spread, representative of data, interpreting graphs, counting methods. Not intended for science and math majors that require MAT 153 or higher.
Offered All terms, Fall, Spring, Summer

MAT 103. Introduction to College Algebra. (4 Units)

Preparation for MAT 151 College Algebra. Graphic, numeric, analytic and applied perspectives on algebraic concepts of linear and nonlinear functions, linear programming, exponents, radicals, exponential functions and transformation of functions. Intended for science and math majors.
Offered All terms, Fall, Spring, Summer

MAT 105. Finite Mathematics. (3 Units)

Prerequisite: Quantitative Reasoning Placement Level 2 or completion of any of MAT 131, MAT 132, MAT 134, MAT 151, MAT 153, or MAT 191. Mathematics of finance, combinatorics, probability, statistical measures of central tendency and dispersion, problem solving and mathematical reasoning, and additional topical selected by instructor e.g. linear programming, statistics, graph theory, game theory. A-C-/NC grading. Satisfies the General Education Quantitative Reasoning Requirement.
Offered Fall, Spring

MAT 107. Mathematics for Elementary School Teachers: Real Numbers. (3 Units)

Prerequisite: Quantitative Reasoning Placement Level 2 or completion of any of MAT 105, MAT 131, MAT 132, MAT 134, MAT 151, MAT 153, or MAT 191. Sets and set theoretic operations as related to counting numbers and rational numbers and arithmetic operations. Real number system and its origins, development, structure and use. Special emphasis on problem solving, and the development and application of algorithms. Does not satisfy General Education Quantitative Reasoning Requirement.
Offered Fall, Spring, All terms

MAT 131. Elementary Statistics and Probability. (3 Units)

Prerequisite: Quantitative Reasoning Placement Level 2 or completion of any of MAT 105, MAT 151, MAT 153, or MAT 191. A practical course in probability and statistics including such topics as the binomial and normal distributions, confidence intervals, t, F, and chi-square tests, linear regression and correlation, and conditional probability. Satisfies the General Education Quantitative Reasoning Requirement.
Offered Fall, Spring

MAT 132. Statistics and Probability with Support. (4 Units)

Recommended prerequisite: MAT 102 or GE Math Ready with Support (Level III) Includes the binomial and normal distributions, confidence intervals, linear regression and correlation, and conditional probability. Satisfies General Education Quantitative Reasoning Requirement.
Offered Fall, Spring

MAT 134. Statistics & Probability - Supported. (4 Units)

MAT 134 is an introduction to statistics, including the binomial and normal distributions, confidence intervals, linear regressions and correlation, hypothesis testing, and conditional probability. Satisfies General Education Quantitative Reasoning. Not for students with credit for MAT 131 or MAT 132. Recommended for students designated "GE Ready with Support (Level III)."
Offered Fall, Spring

MAT 141. Computers for Mathematics Teaching. (3 Units)

Quantitative Reasoning Placement Level 2 or completion of any of MAT 105, MAT 131, MAT 132, MAT 134, MAT 151, MAT 153, or MAT 191. Introduction to computers for teachers of mathematics. Topics include flowcharting, programming in LOGO on microcomputers. Applications of computers to problem solving, statistics, and other areas of mathematics relevant to teachers of mathematics. Applications packages, CAI and social issues are studied. A-C-/NC grading. Does not satisfy General Education Quantitative Reasoning Requirement.
Offered Infrequent

MAT 143. Problem Solving in Mathematics. (3 Units)

Prerequisite: be Quantitative Reasoning Placement Level 2 or completion of any of MAT 105, MAT 131, MAT 132, MAT 134, MAT 151, MAT 153, or MAT 191. Objective is to increase students abilities to use knowledge and experience when encountering new and unexpected situations. Develop higher level thinking skills, learn to formulate, analyze, and model problems. Choosing relevant information, making conjectures, devising plans and testing solutions. A-C-/NC grading. Does not satisfy General Education Quantitative Reasoning Requirement.
Offered Fall, Spring

MAT 151. College Algebra and Trigonometry. (4 Units)

Prerequisites: MAT 103 is required. Graphic, numeric, analytic and applied perspectives on topics including linear, quadratic, exponential, logarithmic and trigonometric functions, exponents and radicals, linear and nonlinear systems of equations and inequalities. Preparation for MAT 191: Calculus I. 3 units of discussion; 1 unit lab.
Offered All terms, Fall, Spring

MAT 153. Pre-Calculus with Trigonometry with Lab. (4 Units)

Prerequisites: Math Placement Category Level 2 or completed GE Quantitative Reasoning. Topics include functions and their graphs; linear, quadratic, rational, exponential, and logarithmic functions; composition, transformation and arithmetic of functions; inverse function; inequalities; right-triangle trigonometry and circular motion; applications to contextual problems. This course is supported with Supplemental Instruction. Preparation for MAT 191: Calculus.
Offered Fall, Spring

MAT 155. Pre-Calculus. (4 Units)

Prerequisite(s): Designation of "GE Ready (Level II)" or with permission of department. Topics include functions and their graphs; linear, quadratic, rational, exponential, and logarithmic functions; composition, transformation, and arithmetic of functions; inverse function; inequalities; right-triangle trigonometry and circular motion; applications to contextual problems. Preparation for MAT 191 Calculus.
Offered Fall, Spring

MAT 171. Survey of Calculus for Management and Life Sciences. (4 Units)

Prerequisite: Quantitative Reasoning Placement Level 2 or completion of any of MAT 105, MAT 131, MAT 132, MAT 134, MAT 151, MAT 153, or MAT 191. Not available for credit to students who have credit in MAT 191 or its equivalent or courses which have MAT 191 as a prerequisite.

Functions, linear equations, the derivative and its applications, the integral and its applications, and partial derivatives. Satisfies the General Education Quantitative Reasoning Requirement.

Offered Fall, Spring

MAT 191. Calculus I. (5 Units)

Prerequisite: MAT 151 or MAT 153 or equivalent with a grade of C or better. Limits, continuity, derivatives, differentiation formulas, applications of derivatives, introduction to integration, fundamental theorem of calculus, application of integration. Satisfies the General Education Quantitative Reasoning Requirement.

Offered Fall, Spring

MAT 193. Calculus II. (5 Units)

Prerequisite: MAT 191 or equivalent with a grade of C or better. Differentiation and integration of transcendental function. Techniques and applications of integration. Polar coordinates. Infinite sequences and series, power series, convergence. Satisfies the General Education Quantitative Reasoning Requirement.

Offered Fall, Spring

MAT 195. Selected Topics in Mathematics. (1-5 Units)

A course in a topic of special interest to both faculty and students for which no current course exists. Topic will be announced in schedule of classes. Repeatable for credit. One to four hours of lecture per week.

Offered As needed, All terms

MAT 207. Mathematics for Elementary School Teachers: Geometry & Statistics. (4 Units)

Prerequisite: Quantitative Reasoning Placement Level 2 or completion of any of MAT 105, MAT 131, MAT 132, MAT 134, MAT 151, MAT 153, or MAT 191. Primarily for prospective elementary school teachers.

Geometry from an intuitive problem solving standpoint. Constructions, symmetry, translations, rotations, patterns, area, volume, and the metric system. Topics from graph theory and topology. Two hours of lecture and two hours of activity per week. Does not satisfy General Education Quantitative Reasoning Requirement.

Offered Fall, Spring

MAT 211. Calculus III. (5 Units)

Prerequisite: MAT 193 or equivalent with a grade of C or better. Multivariable calculus: analytic geometry, scalar and vector products, partial differentiation, multiple integration, change of coordinates, gradient, optimization, line integrals, Green's theorem, elements of vector calculus.

Offered Fall, Spring

MAT 213. Calculus IV. (4 Units)

Prerequisite: MAT 211 or equivalent with a grade of C or better. Topics covered include vector calculus, line and surface integrals, and the theorems of Green, Gauss, and Stokes.

Offered Infrequent

MAT 241. Programming and Technology for Teaching Secondary School Mathematics. (3 Units)

Prerequisite: MAT 193 or equivalent with a grade of C or better.

Introduction to application software appropriate for the teaching of secondary school mathematics. The programs include spreadsheet, geometric modeling, and statistics modeling. Writing simple programs for graphing calculators to demonstrate and solve mathematical problems.

Offered Fall

MAT 247. Elements of Linear Algebra. (3 Units)

Matrix algebra emphasizing small (2x2 and 3x3) matrices and vectors over the real numbers, solutions of systems of equations, determinants, inner product spaces, and linear transformations, with applications to other subjects, e.g. physical and computer science, economics, and operations research.

Offered Fall, Spring

MAT 271. Foundations Of Higher Math. (3 Units)

Prerequisite: MAT 193 with grade of C or better. Topics include logic, methods of mathematical proof, set theory, relations and functions. Introduction to complex numbers and proof strategies using ideas of vector algebra. Meant to prepare students for mathematics program as well as concepts of computer science.

Offered Fall, Spring

MAT 281. Discrete Mathematics. (3 Units)

Prerequisite: a) MAT 151 or MAT 153 and b) CSC 115 or CSC 121 or MAT 241 or equivalent with grade of C or better. Matrix algebra, graph theory, trees, combinatorics, Boolean algebra; with applications to computers and computer programming.

Offered Fall, Spring

MAT 295. Selected Topics In Mathematics. (1-4 Units)

Prerequisites: MAT 193 and consent of instructor. A course in a topic of special interest to both faculty and students for which no current course exists. Topic will be announced in schedule of classes. Repeatable for credit. One to four hours of lecture per week.

Offered As needed

MAT 297. Independent Study. (1-4 Units)

Prerequisites: MAT 193, consent of instructor and consent of department chair. A reading program of selected topics not covered by regularly offered courses conducted under the supervision of a faculty member.

Offered As needed

MAT 307. Foundations of Middle School Mathematics I. (3 Units)

Foundations of Mathematics related to the middle school curriculum. Course 1 includes the following topics: Reasoning with numbers, basic number proofs, understanding exponents, proportional reasoning, rates, linear functions, method of finite differences, and the theory and application of these topics.

Offered Infrequent, All terms

MAT 308. Foundations of Middle School Mathematics II. (3 Units)

Foundations of Mathematics related to the middle school curriculum. Course 2 includes the following topics: basic Euclidean facts, algebra-geometry connections, volume and surface area formulas, similarity, congruence, and scale factors, and the theory and application underlying these topics.

Offered Infrequent

MAT 309. Foundations of Middle School Mathematics III. (3 Units)

Foundations of Mathematics related to the middle school curriculum. Course 3 includes the following topics: concept of functions, inverse functions, properties of rational, trigonometric and exponential functions and fundamental concepts in Calculus.
Offered All terms, Infrequent

MAT 311. Differential Equations. (3 Units)

Prerequisite: MAT 211 and MAT 271 with a grades of C or better. Topics covered include first and second order linear equations including existence and uniqueness theorems, series solutions; nonlinear equations; systems of linear equations. Other topics may include the Laplace transform, qualitative theory.
Offered Fall

MAT 321. Probability and Statistics. (3 Units)

Prerequisite: MAT 193 and MAT 271 or equivalent with grade C or better. A calculus based survey of topics in probability and statistics emphasizing applications.
Offered Fall, Spring

MAT 323. Statistical Inference. (3 Units)

Point and interval estimation, hypothesis testing, simple linear regression, re-sampling. Method of moments, maximum likelihood, bias and variance, mean-squared error, sufficiency, likelihood ratio tests, p-value, power calculation, analysis of variance, Neymann-Pearson lemma, uniformly most powerful tests.
Offered Fall

MAT 327. Introduction to Machine Learning with Software. (3 Units)

Required Prerequisites: MAT 281. Recommended Prerequisite: MAT 131
Machine learning uses methods and concepts to sift through data to create automated prediction and decision programs. This course will develop the underlying mathematical concepts and proficiency with R or similar software to understand, build, and apply machine learning.
Offered Spring

MAT 331. Linear Algebra. (3 Units)

Prerequisite: MAT 247 and MAT 271 or equivalent with a grade of C or better. Linear equations, vector spaces, matrices, linear transformations, determinants, eigenvalues, eigenvectors, etc.
Offered Fall, Spring

MAT 333. Abstract Algebra. (3 Units)

Prerequisite: MAT 271 or equivalent with a grade of C or better. The theory of groups, rings, ideals, integral domains, fields and related results.
Offered Fall

MAT 337. Mathematical Logic. (3 Units)

Prerequisite: MAT 191 or equivalent with a grade of C or better. Topics covered include propositional calculus, classical and intuitionistic; completeness and consistency theorems; first order predicate calculus with equality; axiomatic arithmetic; Godel's incompleteness theorem.
Offered Infrequent

MAT 347. Modern Geometry. (3 Units)

Prerequisite: MAT 271 or equivalent with a grade of C or better. Topics in synthetic and analytic geometry; transformations, similarity, congruence, distance, angles, constructions; introduction to projective and/or non-Euclidean geometry.
Offered Spring

MAT 351. Probability Theory. (3 Units)

Prerequisite: MAT 193 or equivalent with a grade of C or better. Probability as a mathematical system, set theory, conditional probability and independent events, random variables, distribution and density functions, covariance and correlation, limit theorems, convolutions, computer generation of random numbers.
Offered Infrequent

MAT 353. Stochastic Processes. (3 Units)

Prerequisite: MAT 351 or equivalent with a grade of C or better. A selection from among several topics, including Markov chains; Markov processes; queuing, branching, Poisson, and Gaussian processes; stationary processes.
Offered Infrequent

MAT 361. Finite Automata. (3 Units)

Prerequisite: MAT 281 or equivalent with a grade of C or better. Study of the abstract formalization of digital computers. Applications to computation theory and formal linguistics.
Offered Infrequent

MAT 367. Numerical Analysis I. (3 Units)

Prerequisites: Experience in BASIC, FORTRAN or Pascal and MAT 211 or equivalent with a grade of C or better. Approximation of roots of functions, interpolation formulas, numerical solutions of systems of equations, numerical differentiation and integration, numerical solutions to ordinary differential equations.
Offered Infrequent

MAT 369. Numerical Analysis II. (3 Units)

Prerequisite: MAT 367 or equivalent with a grade of C or better. A continuation of MAT 367, including approximation of eigenvalues and eigenvectors, approximation by splines, numerical solutions of parabolic, elliptic, and hyperbolic partial differential equations.
Offered Infrequent

MAT 395. Selected Topics in Math. (1-4 Units)

Prerequisites: MAT 211 and consent of instructor. A course in a topic of special interest to both faculty and students for which no current course exists. Topic will be announced in schedule of classes. Repeatable for credit. One to four hours of lecture per week.
Offered As needed

MAT 396. Practicum in Mathematics. (3 Units)

Prerequisites: Consent on Department Chair or Instructor is required. Supervised work experience, emphasizing hands-on training and application of practical and/or technical skills in mathematics, in a suitable setting. Students will submit a comprehensive report or portfolio. CR/NC grading. Repeatable course.
Offered Fall, Spring

MAT 398S. Directed Research. (1-3 Units)

Offered Infrequent

MAT 401. Advanced Analysis I. (3 Units)

Prerequisites: MAT 211 and MAT 271, or equivalent with a grade of C or better. Elements of set theory, numerical sequences and series, continuity and differentiability of functions of one and several variables.
Offered Fall

MAT 403. Advanced Analysis II. (3 Units)

Prerequisite: MAT 401 or equivalent with a grade of C or better. Integration of functions of one and several variables, sequences and series of functions, uniform convergence, power series, differentiation of functions of several variables.
Offered Spring

MAT 411. Mathematical Modeling. (3 Units)

Prerequisite: MAT 211, MAT 241, and MAT 271 or CSC 121 or CSC 111. Flexible course content depending on interest of instructor and students. Possible topics are: epidemic and predator-prey models from differential equations; linear programming models; Arrow's theorem; and probability models.
Offered Spring

MAT 413. An Introduction to Partial Differential Equations. (3 Units)

Prerequisites: MAT 311 with a grade of C or better is required; MAT 213 is recommended. Solutions to partial differential equations by separation of variables and Fourier series. Applications to heat flow and diffusion, wave motion, and potentials. Some discussion of existence and uniqueness of solutions.
Offered Infrequent

MAT 421. Complex Analysis. (3 Units)

Prerequisites: MAT 211 and MAT 271 with a grade of C or better. MAT 331 and MAT 401 (may be taken concurrently) are recommended. Complex numbers; point sets, sequences and mappings; analytic functions; elementary functions; integration; power series; the calculus of residues; and applications.
Offered Spring

MAT 443. History Of Mathematics. (3 Units)

Prerequisite: MAT 193 with a grade of C or better. Traces the growth and development of mathematics from primitive origins to present, uses methods and concepts of mathematics to present the topics.
Offered Spring

MAT 447. Number Theory. (3 Units)

Prerequisite: MAT 271 with a grade of C or better. Divisibility, congruencies, prime number theory, Diophantine Equations, and other topics from elementary number theory.
Offered Spring

MAT 448. Cryptography. (3 Units)

Prerequisites: MAT 271 with a grade of C or better is required. CSC 115 or CSC 121 with a grade of C or better is recommended. Congruencies and number theory, history and early cryptosystems, cryptographic data structures, public key cryptography, additional cryptosystems such as DES, AES, and elliptic curve cryptography. Computer implementations will also be covered, as well any needed additional mathematical topics (e.g. finite fields.)
Offered Fall

MAT 451. Mathematical Statistics. (3 Units)

Prerequisite: MAT 351 or equivalent with a grade of C or better. Sums of independent random variables; functions of random variables; chi-square, F, and t distributions; estimation of parameters; maximum-likelihood, unbiased, consistent, minimum-variance, and minimum-mean-square error estimators; confidence intervals; central limit theorem.
Offered Infrequent

MAT 460. Graph Theory and Algorithms. (3 Units)

Prerequisites: MAT 211, MAT 271, and MAT 241, or CSC 121, or CSC 115 or equivalent with a grade of C or better are required. MAT 281 with a grade of C or better is recommended. Graphs, digraphs, multigraphs, graph modeling, degrees and degree sequences, subgraphs, isomorphisms of graphs, and digraphs, distance concepts and applications, trees, and tree algorithms, Hamiltonian and Eulerian graphs. The viewpoints will be conceptual, theoretical and algorithmic.
Offered Fall

MAT 489. Fundamental Mathematics and Teaching in Secondary Schools. (4 Units)

Prerequisite: 9 units of 300/400-level mathematics with a grade of C or better; In order to begin the hours for fieldwork in this course, you will need a valid Certificate of Clearance (fingerprints) and proof of a negative TB (within 4 months of the fieldwork course beginning). For information on submitting these documents, contact the Center for Teaching Careers. Synthesis and analysis of secondary mathematics and its teaching. Emphasis will be placed on algebraic thinking and its teaching in high school. Forty hours of secondary classroom observations will be a required activity in this course. A Certificate of Clearance is required.
Offered Spring

MAT 490. Seminar in Mathematics Education. (3 Units)

Prerequisite: 9 units of 300/400 mathematics courses with a grade of C or better. The synthesis and analysis of the secondary mathematics curriculum from an advanced standpoint. Emphasis will be on the integration of problem solving, investigations, reasoning, and communication as recommended in state and national standards.
Offered Fall

MAT 495. Selected Topics In Math. (1-4 Units)

Prerequisites: Consent of instructor and MAT 271. A course in a topic of special interest to both faculty and students for which no current course exists. Topic will be announced in schedule of classes. Repeatable for credit. One to four hours of lecture per week.
Offered As needed

MAT 497. Independent Study. (1-4 Units)

Prerequisites: MAT 211, consent of instructor and consent of department chair. A reading program of selected topics not covered by regularly offered courses conducted under the supervision of a faculty member.
Offered As needed

MAT 500. Mathematics Education Research Design and Statistics. (3 Units)

Prerequisites: Students must have graduate standing and must have completed one year of full time secondary mathematics teaching. Includes topics such as normal distribution, confidence intervals, t, F, chi-squared tests, linear regression, and correlation. These topics are presented in the context of mathematics education research in typical classrooms.
Offered As needed

MAT 501. Foundations of Geometric Thinking. (3 Units)

Prerequisites: MAT 543 or concurrent enrollment. Students must have graduate standing and must have completed one year of full time secondary mathematics teaching. Research on Various topics in geometry. Focus on developing notions of rigorous proof and grade-appropriate explanations. Topics are chosen from the Geometry areas and standards emphasized in K-12.
Offered As needed

MAT 505. Foundations of Mathematical Structures. (3 Units)

Prerequisites: MAT 543 or concurrent enrollment. Students must have graduate standing and must have completed one year of full time secondary mathematics teaching. Topics include the algebraic properties of sets and operations applied to classical number systems, equivalence, modular arithmetic, Diophantine equations, decomposition of natural numbers, special families of natural numbers, current research on understanding and learning these topics.
Offered As needed

MAT 506. Foundations of Rational Numbers. (3 Units)

Prerequisites: MAT 543 or concurrent enrollment. Students must have graduate standing and must have completed one year of full time secondary mathematics teaching. Covers theory and applications of Rational numbers. Focus on number systems, representation of numbers, equivalence classes, rationality and irrationality, properties of the rational numbers system, central ideas of proportional reasoning, and developing intuitive models of standard rules and algorithms.

Offered As needed

MAT 515. Topics in Advanced Finite Math. (3 Units)

Prerequisites: Possession of a baccalaureate degree and one year of full-time secondary mathematics teaching. Topics from areas of Modern Mathematics which relate to the high school mathematics curriculum such as: algorithms, graph theory, coding theory, game theory, finite probability theory, difference equations, voting, recursion.

Offered As needed

MAT 517. Fractals for Teachers. (3 Units)

Prerequisites: Possession of a baccalaureate degree and one year of full-time secondary mathematics teaching. Topics from Fractal and Chaos Theory including: the Cantor Set, Koch Curve, Julia Sets, space filling curves. Brownian motion and Chaotic behavior. Selections to relate to the high school mathematics curriculum.

Offered Infrequent

MAT 521. Geometry For Teachers. (3 Units)

Prerequisites: MAT 543, graduate standing and one year of full time secondary mathematics teaching. Topics from Geometry including: points and lines in a triangle, properties of circles, collinearity, concurrence, transformations, arithmetic and geometric means, isoperimetric theorems, reflection principle.

Offered As needed

MAT 522. Foundations of Algebraic Thinking. (3 Units)

Prerequisites: Students must have graduate standing and must have completed one year of full time secondary mathematics teaching. Patterns, functions, and multiple representations; independent and dependent variables; discrete and continuous functions; linear and nonlinear relationships in context; connections to arithmetic operations; algebraic expressions and equations. Examines current research on the understanding and learning of these topics.

Offered As needed

MAT 523. Theory of Function. (3 Units)

Prerequisites: MAT 543, graduate standing and one year of full time secondary mathematics teaching. Topics from Function Theory including: mathematical models, linear functions, non-linear functions, transformations, limits, continuity, functions of several variables.

Offered As needed

MAT 525. Algebraic Structures for Teachers. (3 Units)

Prerequisites: MAT 543, graduate standing and one year of full time secondary mathematics teaching. Topics relating to the high school Algebra curriculum from an advanced standpoint including algorithms, fields, polynomials, groups, fields, and rings.

Offered As needed

MAT 543. Advanced Problem Solving. (3 Units)

Problem solving using non-routine strategies. Problems to be representative of several branches of mathematics and mathematically based disciplines.

Offered As needed

MAT 545. History of Math Education. (3 Units)

Prerequisites: Graduate standing and one year of full time secondary teaching. Traces the development of the mathematics curriculum K-12 in the United States and internationally, concentrating both on content taught at different stages and the teaching methods employed. Reviews the various mathematics reform efforts over the past 170 years.

Offered As needed

MAT 555. Research in Mathematics Education. (3 Units)

Prerequisites: GED 500 and consent of program. Integrates previous work and experience by emphasizing the application of theoretical models and research designs to the field of mathematics education. Special emphasis will be given to analyzing, organizing, and evaluating findings, and communicating the results.

Offered Infrequent

MAT 557. Research in Math Education I. (3 Units)

Prerequisites: MAT 500 and 15 units of program. Overview of the current research literature pertaining to mathematics education in elementary and secondary schools. Topics such as mathematical reasoning, communication, problem solving, algebra, and geometry will be discussed and analyzed.

Offered As needed

MAT 559. Research in Math Education II. (3 Units)

Prerequisite: MAT 557. Overview of the current research literature pertaining to mathematics education in elementary and secondary schools. Topics such as mathematical reasoning, communication, problem solving, algebra, and geometry will be discussed and analyzed.

Offered As needed

MAT 590. Graduate Seminar in Mathematics Education. (1-4 Units)

Prerequisites: Possession of a baccalaureate degree and one year of full-time secondary mathematics teaching. Presentation and discussion of selected topics in Mathematics Education. Repeatable course.

Offered Infrequent

MAT 594S. Independent Study. (1-4 Units)

Prerequisites: Consent of instructor and department chair. In consultation with a faculty member, the student will investigate in detail current scholarship in some area. Repeatable course.

Offered As needed

MAT 595. Selected Topics. (1-4 Units)

Â An intensive study of selected issues in mathematics education.

Repeatable course.

Offered As needed

MAT 597S. Directed Reading. (1-4 Units)

Prerequisites: Consent of instructor and department chair. Extensive reading in selected areas under the guidance of faculty mentor.

Repeatable course.

Offered Infrequent

MAT 598S. Directed Research. (1-4 Units)

Prerequisite: Classified graduate standing. Students will design and conduct research projects under the direct supervision of the instructor.

Repeatable course.

Offered As needed

MAT 599. Masters Project. (6 Units)

Prerequisite: Advancement to Candidacy. Completion of classroom based project under the guidance of faculty advisor. The culminating learning experience of the program which emphasizes the application of the mathematics education curriculum in the classroom.

Offered As needed

MAT 600. Graduate Continuation Course. (1 Units)

Graduate students who have completed their course work but not their thesis, project, or comprehensive examination, or who have other requirements remaining for the completion of their degree, may maintain continuous attendance by enrolling in this course. Signature of graduate program coordinator required.

Offered Infrequent