399 Principles of Communication (3) Prereq.: Majors only. Introductory course intended for students interested in a career in the communication media. Course focuses on the role of communication in political life and its impact on society.

4010 Magazine Editing and Production (3) Prereq.: MC 2015 and 3101. Majors only. 1 hr. lecture; 3 hrs. lab. Magazine project required. Techniques of magazine editing and production; analysis of magazine industry and specific magazines. Credit will not be given for both this course and MATH 1009.

4150 Advanced Seminar in Political Communication (3) Prereq.: MC 3504 and MC 3505 or consent of instructor. Majors and minors only. Lectures, discussions and research on topics relevant to all aspects of political communication. Includes discussion of theoretical foundations, empirical effects, and normative and ethical implications of political communication processes in democratic governance.

4250 Advanced Seminar in Political Communication (3) Prereq.: MC 3504 and MC 3505 or consent of instructor. Majors and minors only. Lectures, discussions and research on topics relevant to all aspects of political communication. Includes discussion of theoretical foundations, empirical effects, and normative and ethical implications of political communication processes in democratic governance.

4280 Case Studies in Media and Political Campaigns (3) Prereq.: Majors and minors only. Introduction and application of mass communication techniques involved in political campaigns using American media; the media client and message; developing media messages for political campaigns.

4515 Case Studies in Media and Political Campaigns (3) Prereq.: Majors and minors only. The role of mass communication in political campaigns; political actors and processes, and the influence of the audience on media content; media impact on political attitudes and behaviors, especially voting.

4516 Case Studies in Media and Political Campaigns (3) Prereq.: Majors and minors only. The role of mass communication in political campaigns; political actors and processes, and the influence of the audience on media content; media impact on political attitudes and behaviors, especially voting.

MAKING THE MATH

General education courses are marked with stars (★). No student may receive more than nine semester hours of credit in mathematics courses numbered below 1550, with the exception of students who are pursuing the elementary education degree and following the 12-hour sequence specified in that curriculum. No student who has already received credit for a mathematics course numbered 1550 or above may be registered in a mathematics course numbered below 1550, unless given special permission by the Department of Mathematics.

0092 College Algebra (3) Y Prereq.: MATH 0091 or placement by department. Offered by distance program study only. Credit will not be given for both this course and MATH 1021, 1022, or 1023. Prerequisites include a minimum score of 22 on the ACT Math test or a minimum score of 460 on the SAT Math test.

1009 Mathematics for Prospective Elementary School Teachers (3) Y Prereq.: MATH 0092 or placement by department. Offered by distance program study only. Continuation of MATH 1009. Measurement, informal geometry, systems of equations, functions, relation to probability and statistics. Credit will not be given for both this course and MATH 1021, 1022, or 1023. Offered by distance program study only. Basic mathematical skills of graphing, formulas for geometric measurements, systems of linear equations and inequalities, review of quadratic equations, logarithms and applications to exponential growth and decay, triangle trigonometry and its application to geometry and measurement.

1010 Mathematics for Prospective Elementary School Teachers (3) Y Prereq.: MATH 0092 or placement by department. Credit will not be given for both this course and MATH 1021, 1022, or 1023. Prerequisites include a minimum score of 22 on the ACT Math test or a minimum score of 460 on the SAT Math test.

1011 Mathematics for Prospective Elementary School Teachers (3) Y Prereq.: MATH 0092 or placement by department. Credit will not be given for both this course and MATH 1021, 1022, or 1023. Prerequisites include a minimum score of 22 on the ACT Math test or a minimum score of 460 on the SAT Math test.

1012 Planar Trigonometry (3) F,S,Su Prereq.: MATH 1021 or placement by department. Credit will not be given for both this course and MATH 1021, 1022, or 1023. Offered by distance program study only. Basic mathematical skills of graphing, formulas for geometric measurements, systems of linear equations and inequalities, review of quadratic equations, logarithms and applications to exponential growth and decay, triangle trigonometry and its application to geometry and measurement.

1022 Planar Trigonometry (3) F,S,Su Prereq.: MATH 1021 or placement by department. Credit will not be given for both this course and MATH 1021, 1022, or 1023. Offered by distance program study only. Basic mathematical skills of graphing, formulas for geometric measurements, systems of linear equations and inequalities, review of quadratic equations, logarithms and applications to exponential growth and decay, triangle trigonometry and its application to geometry and measurement.

1023 Trigonometry (3) F,S,Su Prereq.: MATH 1021. Credit will not be given for both this course and MATH 1015, 1021, or 1022. For qualified students, a replacement for MATH 1021 and 1022 as preparation for Calculus.

1025 Mathematics of Commerce (3) F,S,Su Prereq.: MATH 1015 or 1021. Interest, discount, annuities, depreciation, and amortization.

1030 Introduction to Contemporary Mathematics (3) Prereq.: MATH 0092 or placement by department. Prereq.: Majors and minors only. Introduction to contemporary mathematical topics. Credit will not be given for both this course and MATH 1010. Credit will not be given for both this course and MATH 1021, 1022, or 1023. Prerequisites include a minimum score of 22 on the ACT Math test or a minimum score of 460 on the SAT Math test.

1100 Introduction to Contemporary Mathematics (3) Y Prereq.: MATH 0092 or placement by department. For students who desire an exposure to mathematics as part of a liberal arts education. An honors course, MATH 1101, is also available. Credit will not be given for this course and MATH 1101. Logic; the algebra of logic, computers, and number systems; networks and combinations; probability and statistics.

1101 HONORS: The Nature of Mathematics (3) V Prereq.: a grade of "A" in MATH 1021 or consent of department. Same as MATH 1100, with special honors emphasis for qualified students. Credit will not be given for this course and MATH 1100. Logic; the algebra of logic, computers, and number systems; networks and combinations; probability and statistics.
2057 Multidimensional Calculus (3) F,Su Prereq.: MATH 1552. An honors course, MATH 2058, is also available. Credit will not be given for both this course and MATH 2057 and 1635.

2060 Techniques of Mathematical Proof (1) F,S,Su Prereq. or concurrent enrollment in MATH 2057. Students are encouraged to enroll in MATH 2057 and 2060 concurrently. Use of complete mathematical proofs, and demonstration of mathematical results; numerical, symbolic, and graphical manipulation of mathematical constructs discussed in MATH 1550.

2065 Elementary Differential Equations (3) F,S Prereq.: MATH 1552. Credit will be given for only one of the following: MATH 2065, 2070, 2090. Ordinary differential equations; Laplace transforms, linear algebra, and Fourier series.

2085 Linear Algebra (3) F,S,Su Prereq.: MATH 1552, 1635 or 2040, or equivalent. An honors course, MATH 2086, is also available. Credit will not be given for both this course and MATH 2085 or 2090.

2090 Elementary Differential Equations and Linear Algebra (4) F,S Prereq.: MATH 1552. Credit will be given for only one of the following: MATH 2065, 2070, 2090. Credit will not be given for both this course and MATH 2085 or 2090. Introduction to first order differential equations, linear differential equations with constant coefficients, and systems of linear differential equations; linear transformations, matrices, determinants, linear independence, bases, systems of equations, eigenvalues, eigenvectors.

2203 Measurement: Proportional and Algebraic Reasoning (3) F,S Prereq.: Professional Practice I Block, 12 sem. credits of mathematics including MATH 1201 and 1202, and concurrent enrollment in EDSE 3125 AND 3126. 2 hrs. lecture; 2 hrs. lab/field experience (as part of Professional Practice I Block). This course is designed II to be integrated in Praxis II with the principles and structures of mathematical reasoning applied to the grades 1-6 classroom. Development of a connected, balanced view of mathematics; application of measurable attributes of objects and the units, systems, and processes of measurement; appropriate techniques, tools, and formulas of measurement; interrelatedness of patterns, relations, and functions; applications of proportional and algebraic reasoning in mathematical situations and structures using contextual, numeric, graphic, and symbolic representations; written communication of mathematics.

3001 Mathematics Classroom Experience (1) F,S Prereq.: MATH 1552, EDSE 2001 and concurrent enrollment in EDSE 3001. 3 hrs. lab. Course provides a carefully supported, monitored, enriched, and collaborative experience in a local middle, or high school under the guidance of a mathematics faculty member and a master teacher. Students will prepare and deliver middle and/or high school mathematics lessons that incorporate appropriate use of technology.

3003 Functions & Modeling (2) Prereq.: MASC 211. Using problem-based learning, technology, and exploring in depth relationships between various areas of mathematics, students strengthen their understanding of core concepts taught at the secondary level. In addition, connections between secondary and college mathematics are investigated.

3355 Probablity (3) F Prereq.: MATH 2057. Suggested for preparation for actuarial exam. Introduction to probability, emphasizing concrete problems and applications; randomness and error, law of large numbers, central limit theorem, and stochastic processes.

3500 Methods of Problem Solving I (1) F Prereq.: MATH 1552 and MATH 2070, 2085, or 2090. May be taken for a max. of 3 hrs. of credit when topics vary. Pass-fail grading.

3501 Methods of Problem Solving II (1) F Prereq.: MATH 2057. Suggested for preparation for actuarial exam. Introduction to probability, emphasizing concrete problems and applications; randomness and error, law of large numbers, central limit theorem, and stochastic processes.

3502 Methods of Problem Solving III (1) F Prereq.: MATH 1552 and MATH 2070, 2085, or 2090. May be taken for a max. of 3 hrs. of credit when topics vary. Pass-fail grading.

3503 Methods of Problem Solving IV (1) F Prereq.: MATH 1552 and MATH 2070, 2085, or 2090. May be taken for a max. of 3 hrs. of credit when topics vary. Pass-fail grading.

4031 Introduction to Topology (3) V Prereq.: MASC 2057. Topology in n-dimensional space, differential calculus in n-dimensional space, inverse and implicit function theorems.

4035 Advanced Calculus of Several Variables (3) F Prereq.: MATH 2085 and 4031. Topology in n-dimensional space, differential calculus in n-dimensional space, inverse and implicit function theorems.

4042 Advanced Calculus II (3) F,S Prereq.: MATH 2085 or 2090. Credit will be given for only one of the following: MATH 2065, 2070, 2085 or 2090. Introduction to first order differential equations, linear differential equations with constant coefficients, and systems of linear differential equations; linear transformations, matrices, determinants, linear independence, bases, systems of equations, eigenvalues, eigenvectors.

4058 Elementary Stochastic Processes (3) Prereq.: MATH 2085 and 2090. Credit will not be given for both this course and MATH 4056. Probabilistic methods of analysis and interpretation of data; probability and random variables; Markov chains, Poisson process, and Brownian motion.
4065 Numerical Analysis I (3) F Prereq.: MATH 2077. Basic programming ability in Fortran, Pascal, or C. Newton's method, Lagrange interpolation, least squares approximation, orthogonal polynomials, numerical differentiation and integration, Gaussian elimination.

4066 Numerical Analysis II (3) F Prereq.: MATH 4065 and one of the following: MATH 2055, 2070, 2090, 4027. Numerical solutions of initial value problems and boundary value problems for differential equations, Numerical methods for solving equations, curve fitting, numerical integration and differentiation, polynomial approximation, numerical solutions of initial value problems, and boundary value problems for differential equations.

4133 Finite Dimensional Vector Spaces (3) Prereq.: MATH 2057 or 2055. Vector spaces, linear transformations, determinants, linear independence, eigenvalues and eigenvectors, and inner product space and canonical forms.

4158 Foundations of Mathematics (3) V Prereq.: MATH 2057 or equivalent. Definitions, systems, sets, relations, product spaces, order, and cardinality.

4171 Theory of Graphs (3) Prereq.: MATH 2085 or consent of department. Fundamental concepts of undirected and directed graphs, trees, connectivity, planarity, colorability, network flows, matching theory, and applications.

4172 Combinatorics (3) F Prereq.: MATH 2085 or equivalent. Topics selected from permutations and combinations, generating functions, principle of inclusion and exclusion, configurations and designs, matching theory, existence problems, applications.

4181 Elementary Number Theory (3) F Prereq.: MATH 2057 or 2085. Divisibility, Euclidean algorithm, prime numbers, congruences, multiplicative functions, such as Chinese remainder theorem and sums of integral squares.

4200 Abstract Algebra I (3) F Prereq.: MATH 2085 or equivalent. Groups, rings, integral domains, fields, homomorphisms, factorization in integers, finite fields, rings, and modules; exact sequences, projective modules; fields; algebraic, transcendental, normal, separable field extensions; Galois theory, valuation theory, Noetherian and Dedekind domains, topics from commutative rings.

4200 Abstract Algebra II (3) Prereq.: MATH 2085 or equivalent. Rings, ideals, factorization in polynomial rings; unique factorization and Euclidean domains, field extensions, splitting fields, finite fields, Galois theory.

4325 Fourier Analysis (3) Prereq.: MATH 1523 and at least one from MATH 2057, 2055, 2070, 2085, 2090. For students majoring in mathematics, physics, and engineering. Fourier analysis and its applications, the integral, and finite cyclic groups; the fast Fourier transform; generalized functions; attention to modern applications and computational methods.

4340 Partial Differential Equations (1-3) V Prereq.: MATH 2057, 2065, and knowledge of Laplace transforms; or MATH 2057, 2065, or 2070 and 2085. First-order partial differential equations and systems, canonical second-order linear equations, Green's functions, method of characteristics, properties of solutions, and applications.

4360 Special Functions (3) V Prereq.: either MATH 2057 and 2090; or MATH 2075, 2065 or 2070 and 2085. Sturm-Liouville problems, orthogonal functions (Bessel, Laguerre, Legendre, and other expansions including Fourier series, recurrence relations and generating functions, gamma and beta functions, Chebyshev polynomials, etc.).

4470 Error-Correcting Codes (3) V Prereq.: MATH 2057 or 2090 or equivalent knowledge of linear algebra. Vector spaces over fields, properties of codes, examples of important codes and decoding techniques, bounds on rates and codes, the weight enumerator polynomial, perfect codes, and other topics.

4700 History of Mathematics (3) V Prereq.: MATH 2040, 2057, and 2085; students entering the course should have a firm sense of what constitutes a proof. This course will have substantial mathematical content; topics such as early Greek mathematics, from Euclid to Archimedes; algebra and number theory from Diophantus to the present; the calculus of Newton and Leibniz; the renewed emphasis on rigor and axiomatic foundations in the 19th and 20th centuries; interactions of mathematics with technology and the natural sciences; biographies of significant mathematicians.

4997 Vertically Integrated Research (3) F, S, or SU Prereq.: permission of the department. Students may work as a team to learn and create new mathematics. Possible forms of learning and exploration, group research projects, and written and oral presentations. Undergraduate students may have a research capstone experience or work as a team as part of a course.

4998 Senior Seminar for Mathematics Majors (3) S Prereq.: the student should be within two semesters of completion of the major; for undergraduate credit only; under guidance of professor teaching the course, student will undertake several independent reading projects and write expository papers; oral presentations will follow preparation of written papers. May be repeated for credit with department consent. May be taken for a max. of 9 sem. hrs. credit.

4999 Topics in Mathematics for Secondary Teachers (1-3) V Prereq.: 6 sem. hrs. of mathematics at or above the level of 2040 or equivalent. May be taken for a max. of 6 sem. hrs. credit. Topics include algebra, geometry, trigonometry, probability, statistics, N.S. students in mathematics with departmental approval. Areas of current interest to teachers of secondary school mathematics.

5031 Implementing the NCTM Standards I (3) May be taken for a max. of 9 sem. hrs. of credit when topics vary. Enrollment is restricted to participants in the Principles and Standards of School Mathematics of the National Council of Teachers of Mathematics.

5032 Implementing the NCTM Standards II (3) May be taken for a max. of 9 sem. hrs. of credit when topic vary. Enrollment is restricted to participants in the teacher-training and grant-supported programs. Topics for mathematics teachers (6-8) to be selected from those in the Principles and Standards of School Mathematics of the National Council of Teachers of Mathematics.

7001 Communicating Mathematics I (1) F Prereq.: consent of department. Practical training in the teaching of undergraduate mathematics for publication; other issues relating to mathematical exposition.

7002 Communicating Mathematics II (1) S Prereq.: consent of department. Presentation of written and oral presentation of mathematical papers; the teaching of mathematics and the uses of technology in the mathematics classroom.

7200 Geometry and Abstract Algebra (3) Prereq.: MATH 2085 or equivalent. Linear algebra, rings, fields, groups, and other algebraic structures.

7216, 7211 Algebra II, I (3,3) 7216 offered S, 7211 offered F Prereq.: MATH 7200 or equivalent. Groups: Sylow theorems, finitely generated abelian groups, rings and modules; exact sequences, projective modules; fields; algebraic, transcendental, normal, separable field extensions; Galois theory, valuation theory, Noetherian and Dedekind domains, topics from commutative rings.

7280 Seminar in Commutative Algebra (1-3) V Prereq.: consent of department. Topics such as commutative rings, homological algebra, algebraic curves, or algebraic geometry.

7420 Seminar in Algebra and Number Theory (1-3) V Prereq.: consent of department. May be repeated for credit with the consent of the department. Advanced topics such as algebraic number theory, algebraic semigroups, quadratic forms, or algebraic K-theory.

7311 Real Analysis I (3) Prereq.: MATH 4032 or equivalent. Axioms of choice, Lebesgue measure and integration, convergence theorems, bounded variation and absolute continuity, differentiability, Minkowski; Holder inequalities, Riesz-Fischer theorem.

7312 Real Analysis II (3) Prereq.: MATH 7311 or equivalent. Hilbert spaces, weak topologies, Riesz representation theorem, several complex variables, or probability theory.

7312 Topology II (3) Prereq.: MATH 7311. Theory of the fundamental group and covering spaces including the Seifert-Van Kampen theorem; universal covering space; classification of covering spaces; selected areas from algebraic or general topology.

7520 Algebraic Topology (3) Prereq.: MATH 7200 and 7510, or consent of department. Basics of homotopy theory, several complex variables, or probability theory.

7550 Differential Geometry and Topology (3) F Prereq.: MATH 7200 and 7510. Aspects of differential geometry, superconductivity, design of photonic band gap materials, fracture mechanics, design of photonic band gap materials, and solution of basic problems in the theory of superconductivity.


7390 Seminar in Analysis (1-3) V Prereq.: consent of department. May be repeated for credit with consent of department. Advanced topics such as classical analysis, partial differential equations, Lie group representation theory, several complex variables, or probability theory.

7490 Seminar in Combinatorics, Graph Theory, and Discrete Structures (1-3) V Prereq.: consent of department. Problems of existence and enumeration in the study of arrangements of elements into sets; advanced topics such as generating functions, recurrence relations, inclusion-exclusion, Polya's theorem, graphs and digraphs, combinatorial designs, incidence matrices, partially ordered sets, matroids, finite geometries, Latin squares, difference sets, matching theory.

7510 Topology I (3) Prereq.: MATH 2057 or equivalent. Basic notions of general topology, with emphasis on Euclidean and metric spaces, continuous and differentiable functions, inverse function theorem and its consequences.

7512 Topology II (3) Prereq.: MATH 7510. Theory of the fundamental group and covering spaces including the Seifert-Van Kampen theorem; universal covering space; classification of covering spaces; selected areas from algebraic or general topology.

7520 Algebraic Topology (3) Prereq.: MATH 7200 and 7510, or consent of department. Basics of homotopy theory, several complex variables, or probability theory.

7550 Differential Geometry and Topology (3) F Prereq.: MATH 7200 and 7510. Aspects of differential geometry, superconductivity, design of photonic band gap materials, fracture mechanics, design of photonic band gap materials, and solution of basic problems in the theory of superconductivity.