MATHEMATICS (MATH)

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MATH 100A Intermediate Algebra
Prerequisites: Appropriate score on the Math Placement Exam.
Notes: Credit earned in MATH 100A will not count toward degree requirements.
Description: Review of the topics in a second-year high school algebra course taught at the college level. Includes: real numbers, 1st and 2nd degree equations and inequalities, linear systems, polynomials and rational expressions, exponents and radicals. Heavy emphasis on problem solving strategies and techniques.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MATH 100A; MATH 101; MATH 103
Groups: Introductory Mathematics

MATH 101 College Algebra
Prerequisites: Appropriate score on the Math Placement Exam; or grade of P, C, or better in MATH 100A.
Notes: Credit for both MATH 101 and 103 is not allowed; students with previous credit in any calculus course (Math 104, 106, 107, or 208) may not earn credit for this course.
Description: Real numbers, exponents, factoring, linear and quadratic equations, absolute value, inequalities, functions, graphing, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions and identities, laws of sines and cosines, applications, polar coordinates, systems of equations, graphing, conic sections.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: CHEM 105A; CHEM 105; CHEM 109; CHEM 109A; CRIM 300; CRIM 300H; CSCE 155T; ECON 215; ECON 215H; ECON 311; FDST 363; MATH 102; MATH 104; MATH 106; METR 100; MSYM 109; PHYS 141; PHYS 141H; PHYS 151; PHYS 151H; PHYS 260; PHYS 261
Groups: Introductory Mathematics

MATH 102 Trigonometry
Prerequisites: Appropriate score on the Math Placement Exam; or grade of P, C, or better in MATH 101.
Notes: Credit for both MATH 102 and 103 is not allowed; students with previous credit in any calculus course (Math 104, 106, 107, or 208) may not earn credit for this course.
Description: Trigonometric functions, identities, trigonometric equations, solution of triangles, inverse trigonometric functions and graphs.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Prerequisite for: CHEM 105; CHEM 105A; CRIM 300; MATH 102; MATH 104; METR 100; METR 140; MSYM 109; PHYS 260; PHYS 261
Groups: Introductory Mathematics

MATH 103 College Algebra and Trigonometry
Prerequisites: Appropriate score on the Math Placement Exam; or grade of P, C, or better in MATH 100A.
Notes: Credit for both MATH 101 and 103 is not allowed; credit for both MATH 102 and MATH 103 is not allowed; students with previous credit in any calculus course (Math 104, 106, 107, or 208) may not earn credit for this course.
Description: First and second degree equations and inequalities, absolute value, functions, polynomial and rational functions, exponential and logarithmic functions, trigonometric functions and identities, laws of sines and cosines, applications, polar coordinates, systems of equations, graphing, conic sections.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Grading Option: Graded with Option
Prerequisite for: AGRO 361; AGRO 361, NRES 361, SOIL 361, WATS 361; AGRO 458; AGRO 858; NRES 458; NRES 858; SOIL 458; ASCI 340; CHEM 105A; CHEM 105; CHEM 109A; CHEM 113A; CRIM 300; CSCE 155T; CSCE 155; CSCE 155H; CSCE 155N; CSCE 155T; GEOL 200; MATH 104; MATH 106; METR 100; MSYM 109; PHYS 141; PHYS 141H; PHYS 151; PHYS 260; PHYS 261; SOFT 160; SOFT 160H
Groups: Introductory Mathematics

MATH 104 Applied Calculus
Prerequisites: Appropriate score on the Math Placement Exam; or grade of P, C, or better in MATH 101, MATH 102 or MATH 103.
Description: Rudiments of differential and integral calculus with applications to problems from business, economics, and social sciences.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ABUS 341; MRKT 341; ACCT 200; ACCT 201; ACCT 308; ACCT 309; ACCT 313; AECN 465; AECN 865; NREE 465; WATS 465; AGRO 361; GEOL 361; NRES 361; SOIL 361; WATS 361; AGRO 472; AGRO 872; NRES 472; NRES 872; SOIL 472; WATS 472; ARCH 333; CNST 305; ASCI 340; BLAW 371; BLAW 371H; BLAW 372; BLAW 372H; BSEN 355; CHEM 109A; CNST 241; CNST 242; CNST 251; CNST 252; CNST 306; CRIM 300; CSCE 155A; CSCE 155E; CSCE 155H; CSCE 155N; CSCE 155T; ECON 215; ECON 215H; ECON 311; FDST 363; MSYM 363; FINA 361; FINA 361H; MATH 104; METR 100; MNGT 301; MNGT 301H; MRKT 341H; RAIF 341H; MSYM 109; PHYS 141; PHYS 141H; PHYS 151; PHYS 260; PHYS 261; SOFT 160; SOFT 160H
Groups: Introductory Mathematics

MATHEMATICS (MATH) 1

Mathematics (MATH)
MATH 106 Calculus I
Prerequisites: Appropriate score on the Math Placement Exam; or grade of P, C, or better in MATH 102 or MATH 103.
Notes: Credit for both MATH 104 and MATH 106 is not allowed.
Description: Functions of one variable, limits, differentiation, exponential, trigonometric and inverse trigonometric functions, maximum-minimum, and basic integration theory (Riemann sums) with some applications.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Grading Option: Graded with Option
Prerequisite for: MATH 107, MATH 107R

MATH 107 Calculus II
Prerequisites: A grade of P or C or better in MATH 106.
Description: Integration theory, techniques of integration; applications of definite integrals; series, Taylor series, vectors, cross and dot products, lines and planes, space curves.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: MATH 107, MATH 107R

MATH 107H Honors: Calculus II
Prerequisites: Good standing in the University Honors Program or by invitation; and a grade of "B" or better in MATH 106 or equivalent
Description: For course description, see MATH 107.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: MATH 107H

MATH 107R Analytic Geometry and Calculus II
Prerequisites: A grade of P or C or better in MATH 106.
Notes: Open only to students who previously completed the 5 credit hour MATH 107 at UNL and wish to improve their grade.
Description: Integration theory, techniques of integration, applications of definite integrals, series, Taylor series, vectors, cross and dot products, lines and planes, space curves.
Credit Hours: 5
Max credits per semester: 5
Max credits per degree: 5
Grading Option: Graded with Option
Prerequisite for: MATH 107, MATH 107R

Mathematics (MATH)
MATH 191 Special Topics in Mathematics  
Description: Topics vary.  
Credit Hours: 1-6  
Min credits per semester: 1  
Max credits per semester: 6  
Max credits per degree: 6  
Grading Option: Graded with Option  
Prerequisite for: METR 100; METR 140; PHYS 141; PHYS 260; PHYS 261  
Groups: Seminars, Ind Study, Topics  

MATH 203 Contemporary Mathematics  
Notes: Credit toward the degree cannot be earned in both MATH 203 and MATH 203J.  
Description: Applications of quantitative reasoning and methods to problems and decision making in the areas of management, statistics, and social choice. Includes networks, critical paths, linear programming, sampling, central tendency, inference, voting methods, power index, game theory, and fair division problems.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  
ACE: ACE 3 Math/Stat/Reasoning  
Groups: Introductory Mathematics  

MATH 203J Contemporary Math  
Prerequisites: Must be admitted to the College of Journalism  
Notes: Credit toward the degree cannot be earned in both MATH 203 and MATH 203J.  
Description: Applications of quantitative reasoning and methods to problems and decisions making in areas of particular relevance to College of Journalism and Mass Communication, such as governance, finance, statistics, social choice, and graphical presentation of data. Financial mathematics, statistics and probability (sampling, central tendency, and inference), voting methods, power index, and fair division problems.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  
ACE: ACE 3 Math/Stat/Reasoning  
Groups: Introductory Mathematics  

MATH 208H Honors: Calculus III  
Prerequisites: Good Standing in the University Honors Program and a grade of P, C, or better in MATH 107 or MATH 107H  
Description: Vectors and surfaces, parametric equations and motion, functions of several variables, partial differentiation, maximum-minimum, Lagrange multipliers, multiple integration, vector fields, path integrals, Green's Theorem, and applications.  
Credit Hours: 4  
Max credits per semester: 4  
Max credits per degree: 4  
Grading Option: Graded with Option  
Prerequisite for: ABUS 341, MRKT 341; ACTS 401; BLAW 371; BLAW 371H; BLAW 372; BLAW 372H; CSCE 155A; CSCE 155E; CSCE 155H; CSCE 155N; CSCE 155T; CSCE 156; CSCE 156H; ECEN 215; ECEN 305; ECEN 306; ECEN 328; ECON 311; FINA 361; FINA 361H; MATH 208; MATH 221; MATH 314; MATH 325; MATH 407; MATH 495; MECH 223H; MECH 318; MECH 321; MECH 325; MECH 325H; MECH 373; MECH 373H; MECH 421, MECH 821, ENGR 421; METR 311; MNGT 301; MNGT 301H; MRKT 341H; RAIK 341H; PHYS 141H; PHYS 151; PHYS 211H; PHYS 213H; SCMA 331; SCMA 335; SCMA 350; SCMA 350H; STAT 262; STAT 462  
ACE: ACE 3 Math/Stat/Reasoning  
Groups: Introductory Mathematics  

MATH 221 Differential Equations  
Prerequisites: A grade of P, C, or better in MATH 107 or MATH 107H  
Description: First- and second-order methods for ordinary differential equations including: separable, linear, Laplace transforms, linear systems, and some applications.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  
Prerequisite for: AGEN 303, BSEN 303; AGEN 344, BSEN 344; AGEN 350, BSEN 350; AGEN 953, AGEN 957, CIVE 957, GEOL 957; BSEN 260, AGEN 260; BSEN 317; BSEN 326, CIVE 326; BSEN 326, CIVE 326; CIVE 326; BSEN 954; BSEN 954; CHME 312; CHME 815; CHME 825; CHME 835; CIVE 310; CIVE 310H; ECEN 213; ECEN 216; ECEN 304; ECEN 306; ECEN 328; ENGR 410; MATH 430; MATH 435; MECH 310, MECH 310H; MECH 318; MECH 330; MECH 381; MECH 449, MECH 849; MECH 454; MECH 854; MECH 480; MECH 880; MECH 810; MECH 881; MECH 925; MECH 933; MECH 938; MECH 938; MECH 939; METR 312; PHYS 313; PHYS 422, PHYS 822, ECEN 422, ECEN 822  
ACE: ACE 3 Math/Stat/Reasoning  
Groups: Introductory Mathematics  

MATH 221H Honors: Differential Equations  
Prerequisites: Good Standing in the University Honors Program and a grade of P, C, or better in MATH 107 or MATH 107H  
Description: For course description, see MATH 221/821.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded  
Prerequisite for: AGEN 303, BSEN 303; AGEN 344, BSEN 344; AGEN 350, BSEN 350; BSEN 260, AGEN 260; BSEN 317; BSEN 326, CIVE 326; CIVE 326; CIVE 326; BSEN 954; BSEN 954; CHME 312; CHME 815; CHME 825; CHME 835; CIVE 310; CIVE 310H; ECEN 213; ECEN 216; ECEN 304; ECEN 306; ECEN 328; ENGR 410; MATH 430; MATH 435; MECH 310, MECH 310H; MECH 318; MECH 330; MECH 810; PHYS 311  
ACE: ACE 3 Math/Stat/Reasoning  
Groups: Introductory Mathematics
MATH 300 Mathematics Matters
Prerequisites: TEAC 308 or TEAC 416D or parallel.
Notes: Credit toward the degree may be earned in only one of: MATH 300 or MATH 300M.
Description: Numbers and operations. Develop an understanding of mathematics taught in the elementary school.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MATH 301; TEAC 297E; TEAC 308
Groups: Introductory Mathematics

MATH 301 Geometry Matters
Prerequisites: MATH 300
Description: Geometry and measurement. Develop an understanding of geometry as taught in the elementary school.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Groups: Introductory Mathematics

MATH 302 Math Modeling
Notes: MATH 300 is a strongly recommended prerequisite. Intended for middle grades teaching endorsement majors with a mathematics emphasis and/or to elementary education majors who want a mathematics concentration.
Description: Using mathematics to model solutions or relationships for realistic problems taken from the middle school curriculum. The mathematics for these models are a mix of algebra, geometry, sequences (dynamical systems, queuing theory), functions (linear, exponential, logarithmic), and logic. Mathematical terminology, concepts and principles. Calculator based lab devices, graphing calculators, and computers as tools to collect data, to focus on concepts and ideas, and to make the mathematics more accessible.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Groups: Introductory Mathematics

MATH 309 Introduction to Mathematical Proofs
Prerequisites: A grade of P, C, or better in MATH 107 or MATH 107H
Description: Basic set theory; elements of logic and types of proofs; induction; study of relations and functions; and cardinality of sets.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MATH 325; MATH 430; MATH 471

MATH 310 Introduction to Modern Algebra
Prerequisites: A grade of P, C, or better in MATH 107 or MATH 107H
Description: Elementary number theory, including induction, the Fundamental Theorem of Arithmetic, and modular arithmetic. Introduction to rings and fields as natural extension of the integers. Particular emphasis on the study of polynomials with coefficients in the rational, real, or complex numbers.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MATH 325; MATH 350; MATH 407; MATH 408; MATH 417; MATH 430; MATH 450; MATH 452; MATH 471

MATH 314 Linear Algebra
Prerequisites: A grade of P, C, or better in MATH 107 or MATH 107H
Description: Fundamental concepts of linear algebra, including properties of matrix arithmetic, systems of linear equations, vector spaces, inner products, determinants, eigenvalues and eigenvectors, and diagonalization.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: CSCE 970; MATH 405; MATH 430; MATH 435; MATH 471; MECH 350; STAT 871; STAT 970
ACE: ACE 3 Math/Stat/Reasoning

MATH 314H Honors: Linear Algebra
Prerequisites: Good Standing in the University Honors Program and a grade of P, C, or better in MATH 107 or MATH 107H
Description: For course description, see MATH 314.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MATH 405; MATH 430; MATH 471; MECH 350; STAT 871
ACE: ACE 3 Math/Stat/Reasoning

MATH 316 Case Studies in Theoretical Ecology
Crosslisted with: BIOS 316, NRES 316
Prerequisites: MATH 106 or higher OR LIFE 121. Parallel registration in BIOS 316L.
Description: Introduction to biological literature, applied mathematics, computer programming, and/or statistical techniques relevant to field questions in ecology, evolution, and behavior. Typical mathematical topics include discrete dynamics, systems of differential equations, matrix algebra, or statistical inference and probability.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 4 Science
Groups: Advanced Mathematics Courses
MATH 325 Elementary Analysis
Prerequisites: A grade of P, C, or better in MATH 208/208H, MATH 309, or MATH 310.
Description: An introduction to mathematical reasoning, construction of proofs, and careful mathematical writing in the context of continuous mathematics and calculus. Topics may include the real number system, limits and continuity, the derivative, integration, and compactness in terms of the real number system.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MATH 425; MATH 430; MATH 450; MATH 452; MATH 471

MATH 350 Geometry for High School Teaching
Prerequisites: A grade of P, C, or better in MATH 310 or MATH 310H
Notes: NOT open to MATH majors EXCEPT those under degree option "E" who are seeking a secondary mathematics teaching endorsement.
Description: Modern elementary geometry, plane transformations and applications, the axiomatic approach, Euclidean constructions. Additional topics vary.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MATH 408
Groups: Introductory Mathematics

MATH 398 Special Topics in Mathematics
Prerequisites: Permission. A grade of P, C, or better in MATH 310 or MATH 310H
Notes: MATH 314/814; and MATH 309, MATH 310, or MATH 325.
Description: Topics fundamental to the study of linear transformations on finite and infinite dimensional vector spaces over the real and complex number fields including: subspaces, direct sums, quotient spaces, dual spaces, matrix of a transformation, adjoint map, invariant subspaces, triangularization and diagonalization. Additional topics may include: Riesz Representation theorem, projections, normal operators, spectral theorem, polar decomposition, singular value decomposition, determinant as an n-linear functional, Cayley-Hamilton theorem, nilpotent operators, and Jordan canonical form.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 408 Mathematics for High School Teaching II
Prerequisites: A grade of C, P, or better grade in MATH 310 and 350
Notes: Open only MATH majors with a declared education option.
Description: Analysis of the connections between college mathematics and high school algebra and geometry.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 415 Theory of Linear Transformations
Crosslisted with: MATH 815
Prerequisites: MATH 314/814, and MATH 309, MATH 310, or MATH 325.
Description: Topics fundamental to the study of linear transformations on finite and infinite dimensional vector spaces over the real and complex number fields including: subspaces, direct sums, quotient spaces, dual spaces, matrix of a transformation, adjoint map, invariant subspaces, triangularization and diagonalization. Additional topics may include: Riesz Representation theorem, projections, normal operators, spectral theorem, polar decomposition, singular value decomposition, determinant as an n-linear functional, Cayley-Hamilton theorem, nilpotent operators, and Jordan canonical form.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 417 Group Theory
Prerequisites: A grade of P, C, or better in MATH 310 or MATH 310H
Description: Elementary group theory, including cyclic, dihedral, and permutation groups; subgroups, cosets, normality, and quotient groups; fundamental isomorphism theorems; the theorems of Cayley, Lagrange, and Cauchy; and if time allows, Sylow's theorems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product
Groups: Advanced Mathematics Courses
MATH 423 Complex Analysis
Crosslisted with: MATH 823
Prerequisites: A grade of P, C, or better in MATH 208 or MATH 208H
Description: Complex numbers, functions of complex variables, analytic functions, complex integration, Cauchy's integral formulas, Taylor and Laurent series, calculus of residues and contour integration, conformal mappings, harmonic functions. Applications of these concepts in engineering, physical sciences, and mathematics.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Groups: Advanced Mathematics Courses

MATH 424 Introduction to Partial Differential Equations
Crosslisted with: MATH 824
Prerequisites: A grade of P, C, or better in MATH 208/208H and MATH 221/221H.
Notes: Not open to MA or MS students in mathematics or statistics.
Description: Derivation of the heat, wave, and potential equations; separation of variables method of solution; solutions of boundary value problems by use of Fourier series, Fourier transforms, eigenfunction expansions with emphasis on the Bessel and Legendre functions; interpretations of solutions in various physical settings.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MECH 812

MATH 425 Mathematical Analysis
Prerequisites: A grade of P, C, or better in MATH 325
Description: Real number system, topology of Euclidean space and metric spaces, compactness, sequences, series, convergence and uniform convergence, and continuity and uniform continuity.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: MECH 812

MATH 428 Principles of Operations Research
Crosslisted with: MATH 828
Prerequisites: MATH 314 or MATH 314H; and RAIK 270H, STAT 380, or MECH 321.
Description: Introduction to techniques and applications of operations research. Includes linear programming, queuing theory, decision analysis, network analysis, and simulation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product

MATH 430 Ordinary Differential Equations
Prerequisites: MATH 221 or MATH 221H; MATH 314 or MATH314H; MATH 309, MATH 310, or MATH 325.
Description: Qualitative behavior of solutions of systems of differential equations, including existence and uniqueness, extendibility, and periodic solutions. The Putzer algorithm, Floquet theory, matrix norms, linearization, stability theory, and period-doubling and chaos.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 433 Nonlinear Optimization
Crosslisted with: MATH 833
Prerequisites: MATH 314/814 and MATH 310 or MATH 325
Description: Mathematical theory of unconstrained and constrained optimization for nonlinear multivariate functions, particularly iterative methods, such as quasi-Newton methods, least squares optimization, and convex programming. Computer implementation of these methods.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 435 Math in the City
Prerequisites: Two of MATH 221, MATH 221H, MATH 314, MATH 314H, RAIK 270H, STAT 380.
Description: A research experience modeling problems of current interest to the local community, businesses, or government.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product

MATH 439 Mathematical Models in Biology
Crosslisted with: MATH 839
Prerequisites: A grade of P, C, or better in MATH 221/221H.
Description: Discrete and continuous models in ecology: population models, predation, food webs, the spread of infectious diseases, and life histories. Elementary biochemical reaction kinetics; random processes in nature. Use of software for computation and graphics.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 440 Numerical Analysis I
Crosslisted with: CSCE 440, CSCE 840, MATH 840
Prerequisites: CSCE 155A, CSCE 155E, CSCE 155H, CSCE 155N, CSCE 155T, or SOFT 160; MATH 107.
Notes: Credit toward the degree may be earned in only one of the following: CSCE/MATH 440/840 and MECH 480/880.
Description: Principles of numerical computing and error analysis covering numerical error, root finding, systems of equations, interpolation, numerical differentiation and integration, and differential equations. Modeling real-world engineering problems on digital computers. Effects of floating point arithmetic.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: CSCE 942, MATH 942
MATH 441 Approximation of Functions
Crosslisted with: CSCE 441, CSCE 841, MATH 841
Prerequisites: MATH 221/MATH 221H and MATH 314/MATH 314H.
Description: Polynomial interpolation, uniform approximation, orthogonal
polynomials, least-first-power approximation, polynomial and spline
interpolation, approximation and interpolation by rational functions.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: CSCE 942, MATH 942
Groups: Advanced Mathematics Courses

MATH 445 Number Theory
Crosslisted with: MATH 845
Prerequisites: MATH 310.
Description: Fundamentals of number theory, including congruences,
primality tests, factoring methods. Diophantine equations, quadratic
reciprocity, continued fractions, and elliptic curves.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 447 Numerical Linear Algebra
Crosslisted with: CSCE 447, CSCE 847, MATH 847
Prerequisites: MATH 314
Description: Mathematics and algorithms for numerically stable
matrix and linear algebra computations, including solution of linear
systems, computation of eigenvalues and eigenvectors, singular value
decomposition, and QR decomposition.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 450 Combinatorics
Prerequisites: MATH 309, MATH 310, or MATH 325.
Description: Theory of enumeration and/or existence of arrangements of
objects: Pigeonhole principle, inclusion-exclusion, recurrence relations,
generating functions, systems of distinct representatives, combinatorial
designs and other applications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 452 Graph Theory
Prerequisites: MATH 310 or MATH 325
Notes: Selected applications.
Description: Theory of directed and undirected graphs. Trees, circuits,
subgraphs, matrix representations, coloring problems, and planar graphs.
Methods which can be implemented by computer algorithms.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Groups: Advanced Mathematics Courses

MATH 471 Introduction to Topology
Prerequisites: MATH 314 or MATH 314H; and MATH 309, MATH 310, or
MATH 325.
Description: Elementary point-set and geometric topology. Point-
set topics include topological spaces, continuous functions,
homeomorphisms, connectedness, compactness, quotient spaces.
Geometric topology topics include Euler characteristic, classification of
surfaces, and other applications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 487 Probability Theory
Crosslisted with: MATH 887
Prerequisites: MATH 314 or MATH 314H; and MATH 309, MATH 310, or
MATH 325.
Description: Probability, conditional probability, Bayes’ theorem,
independence, discrete and continuous random variables, density
and distribution functions, multivariate distributions, probability and
moment generating functions, the central limit theorem, convergence of
sequences of random variables, random walks, Poisson processes and
applications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

MATH 489 Stochastic Processes
Crosslisted with: MATH 889
Prerequisites: MATH 314 or MATH 314H; and STAT 380 or RAIK 270H.
Description: Markov chains, continuous-time Markov processes, the
Poisson process, Brownian motion, introduction to stochastic calculus.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product

MATH 495 Seminar
Prerequisites: MATH 208 or 208H; and permission.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option
Groups: Seminars, Ind Study, Topics

MATH 496 Seminar in Mathematics
Crosslisted with: MATH 896
Prerequisites: Permission.
Description: Topics in one or more branches of mathematics.
Credit Hours: 0-4
Min credits per semester:
Max credits per semester: 4
Max credits per degree: 13
Grading Option: Graded with Option
Groups: Seminars, Ind Study, Topics
MATH 497 Reading Course
Prerequisites: Permission.
Credit Hours: 1-4
Min credits per semester: 1
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Groups: Seminars, Ind Study, Topics