MA-Mathematics Courses

Courses

MA 094. Basic Mathematics. 3 Hours.
Whole numbers, fractions, decimals, ratios and proportions, percentages, integers, basic geometry, and basic algebra including linear equations and applications. Designed to prepare students for MA 110, Finite Mathematics. Students preparing to take MA 102 should take MA 098. Attendance at the first meeting is mandatory. MA 094 section QL is an on-line version of MA 094 intended primarily for students who have job conflicts or live a long distance from the campus. There are no campus based meetings with the on-line class. However, students in the on-line version of MA 094 are required to interact with peers and the instructor through an on-line format and should be able to work independently and be motivated self-starters who are confident in their ability to master mathematics. Non-credit; does not contribute to any degree requirements. 0.000 Credit Hours.

MA 098. Basic Algebra. 3 Hours.
Arithmetic of integers, rational numbers, real numbers, exponents, polynomial algebra, factoring, rational functions, linear and quadratic equations, elementary geometry, verbal problems. Designed to prepare students for college level math courses. Attendance at the first day of class is mandatory. Attendance at the first lab meeting is mandatory. MA 098 section QL is an on-line version of MA 098 and is intended primarily for students who have job conflicts or live a long distance from the campus. There are no campus based meetings with the on-line class. However, students in the on-line version of MA098 are required to interact with peers and the instructor through an on-line format and should be able to work independently and be motivated self-starters who are confident in their ability to master mathematics. Non-credit; does not contribute to any degree requirements. 0.000 Credit Hours.

MA 102. Intermediate Algebra. 3 Hours.
Absolute values, Cartesian coordinates, graphs of linear equations, concept of a function, linear systems, algebra of polynomials, factoring of polynomials, algebra of rational expressions, literal equations, word problems involving linear, rational and quadratic models, integer and rational exponents, radical expressions, rational, radical and quadratic equations, complex numbers. Consists of one, mandatory, scheduled 50 minute lecture per week, plus 50 minutes of individually scheduled lab time per week. Quantitative Literacy is a significant component of this course. This course meets the Core Curriculum requirements for Area III: Mathematics. Prerequisites: MA 098 [Min Grade: C] or MPL 30 or EMA E

MA 105. Pre-Calculus Algebra. 3 Hours.
Functions from algebraic, geometric (graphical), and numerical points of view, including polynomial, rational, logarithmic, and exponential functions; inverse functions; systems of equations and inequalities; quadratic and rational inequalities; complex and real roots of polynomials; applications and modeling, both scientific and business. Supports development of quantitative literacy. Consists of one scheduled 50 minute lecture per week, plus one 50 minute scheduled lab meeting per week, plus 50 minutes of individually scheduled lab time per week. Attendance at the first day of class is mandatory. Attendance at the first lab meeting is mandatory. May not be enrolled in Undergraduate Certificate. Lecture, online at least 80%. Quantitative Literacy is a significant component of this course. This course meets the Core Curriculum requirements for Area III: Mathematics. Prerequisites: MA 102 [Min Grade: C] or MPL 46 or EMA E

MA 106. Pre-Calculus Trigonometry. 3 Hours.
Trigonometric functions (circular functions) and their inverses, graphs, and properties; right triangle trigonometry and applications; analytical trigonometry, trigonometric identities and equations; polar coordinates; complex numbers; laws of sines and cosines; conic sections. Supports development of quantitative literacy. Consists of one scheduled 50 minute lecture per week, plus one 50 minute scheduled lab meeting per week, plus 50 minutes of individually scheduled lab time per week. Attendance at the first day of class is mandatory. Attendance at the first lab meeting is mandatory. Quantitative Literacy is a significant component of this course. This course meets the Core Curriculum requirements for Area III: Mathematics. Prerequisites: MA 105 [Min Grade: C] or MPL 61 or EMA E

MA 107. Pre-Calculus Algebra and Trigonometry. 4 Hours.
Functions, their graphs and applications, including polynomial, rational, algebraic, exponential, logarithmic, and trigonometric functions. A fast-paced course designed as a review of the algebra and trigonometry needed in calculus. (MA107 is a combination of MA105 Pre-Calculus Algebra and MA106 Pre-Calculus Trigonometry taught in a single semester.) Satisfies core curriculum requirement in mathematics. Supports development of quantitative literacy. Consists of two scheduled 50 minute lectures per week, plus one 50 minute scheduled lab meeting per week, plus 50 minutes of individually scheduled lab time per week. Attendance at the first day of class is mandatory. Attendance at the first lab meeting is mandatory. Quantitative literacy is a significant component of this course. This course meets the Core Curriculum requirements for Area III: Mathematics. Prerequisites: MA 102 [Min Grade: B] or MPL 68 or EMA E

MA 110. Finite Mathematics. 3 Hours.
An overview of topics of finite mathematics and applications of mathematics for the liberal arts student. Topics include counting, permutations, combinations, basic probability, conditional probability, descriptive statistics, binomial and normal distributions, statistical inference, and additional selected topics. Students construct models of real world situations, translate verbal descriptions into mathematical form, interpret and create graphical representations of mathematical relationships, use quantitative evidence as a basis for reasoning, argument, and drawing conclusions, and communicate their results to an audience appropriately. May not be enrolled in Undergraduate Certificate. Quantitative Literacy is a significant component of this course. This course meets the Core Curriculum requirements for Area III: Mathematics. Prerequisites: MA 094 [Min Grade: C] or MA 098 [Min Grade: C] or MA 102 [Min Grade: C] or MTH1 75 or MTH2 75 or MTH3 75 or MTH4 75 or MTH5 75 or MPL 30 or EMA E
MA 120. Introduction to Symbolic Logic. 3 Hours.
Modern theory of deductive inference. Emphasis on recognizing valid forms of reasoning. Truth-function theory and some concepts of one-variable quantification theory. May not be used to satisfy Core Curriculum requirement in mathematics.

MA 125. Calculus I. 4 Hours.
Limit of a function; continuity, derivatives of algebraic, trigonometric, exponential, and logarithmic functions, application of derivative to extremal problems, optimization, and graphing; Newton method; the definite integral and its application to area problems; fundamental theorem of integral calculus, average value, and substitution rule. Quantitative literacy is a significant component of this course. This course meets the Core Curriculum requirements for Area III: Mathematics.
Prerequisites: MA 106 [Min Grade: C] or MA 107 [Min Grade: C] or MTH4 75 or MTH5 75 or MPL 76 or EMA E

MA 126. Calculus II. 4 Hours.
Techniques of integration; applications in integration such as volume, arc length and work; infinite series, Taylor series; polar coordinates; parametric equations; plane and space vectors; lines and planes in space. Quantitative Literacy is a significant component of this course. This course meets the Core Curriculum requirements for Area III: Mathematics.
Prerequisites: MA 125 [Min Grade: C] or MA 225 [Min Grade: C] or MTH5 75

MA 180. Introduction to Statistics. 3 Hours.
Descriptive and inferential statistics, probability distributions, estimation, hypothesis testing. Quantitative Literacy is a significant component of this course.
Prerequisites: MA 102 [Min Grade: C] or MA 105 [Min Grade: C] or MA 106 [Min Grade: C] or MA 107 [Min Grade: C] or MA 110 [Min Grade: C] or MA 125 [Min Grade: C] or MA 225 [Min Grade: C] or MPL 46

MA 224. Intermediate Symbolic Logic. 3 Hours.
Full development of quantification theory, including identity and definite description, and soundness and completeness proofs. Skill in formal proof emphasized, as well as ability to express arguments from natural language in artificial language.
Prerequisites: MA 120 [Min Grade: C] or PHL 220 [Min Grade: C]

MA 225. Calculus I - Honors. 4 Hours.
Limit of a function; continuity, derivatives of algebraic, trigonometric, exponential, and logarithmic functions, application of derivative to extremal problems, optimization, and graphing; Newton method; the definite integral and its application to area problems; fundamental theorem of integral calculus, average value, and substitution rule. Students will be required to display an in-depth understanding of these topics through a complete justification of their work on tests and through participation in class projects. Quantitative literacy is a significant component of this course.
Prerequisites: MA 106 [Min Grade: C] or MA 107 [Min Grade: C] or MTH4 75 or MTH5 75 or MPL 76 or EMA E

MA 226. Calculus II - Honors. 4 Hours.
Techniques of integration; applications in integration such as volume, arc length and work; infinite series, Taylor series; polar coordinates; parametric equations; plane and space vectors; lines and planes in space. Quantitative Literacy is a significant component of this course.
Prerequisites: MA 225 [Min Grade: C] or MA 125 [Min Grade: C] or MTH5 75

MA 227. Calculus III. 4 Hours.
Vector functions, functions of two or more variables, partial derivatives, quadric surfaces, multiple integration and vector calculus, including Greens Theorem, curl and divergence, surface integrals, and Gauss' and Stokes' Theorem. This course meets the Core Curriculum requirements for Area III: Mathematics.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 252. Introduction to Differential Equations. 3 Hours.
First order differential equations (separable, linear, exact, and additional non-linear examples using MAPLE), modeling with first order DE's, examples of systems of first order DE's, theory of higher order linear DE's (homogeneous and non-homogeneous, superposition of solutions, linear independence and general solutions, initial and boundary value problems), solution of constant coefficient homogeneous linear equations, variation of parameters and Green's functions with complicated cases done using MAPLE. Modeling projects in the course will emphasize the use of MAPLE to do the heavy lifting. Quantitative Literacy and Writing are significant components of this course. This course meets the Core Curriculum requirements for Area III: Mathematics.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 260. Introduction to Linear Algebra. 3 Hours.
Linear equations and matrices; real vector spaces, basis, diagonalization, linear transformations; determinants, eigenvalues, and eigenvectors; inner product spaces, matrix diagonalization; applications and selected additional topics. MA 260 and MA 434 may not both be counted toward the major or minor. This course meets the Core Curriculum requirements for Area III: Mathematics.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 265. Math Tools for Engineering Problem Solving. 4 Hours.
An applied mathematics course designed to utilize the terminology and problem-solving approaches inherent to engineering, while completing the mathematical preparation of most engineering students. This course includes elements of MA 227 and MA 252.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 268. Introduction to Mathematical Biology. 3 Hours.
This course, designed at the interface of several disciplines, targets undergraduate students in biology, mathematics, and engineering. We will review the biology of problems that arise in nature and medicine and study the mathematics that allows us to tackle these problems. This course serves as an introduction, by example, to multivariable calculus, discrete and continuous differential equations in one or more variables, vectors, matrices, linear and non-linear dynamical systems, and basic concepts of chaos. Biological topics may include single species and interacting population dynamics, modeling infectious and dynamic diseases, regulation of cell function, molecular interactions and receptor-ligand binding, biological oscillators, and an introduction to biological pattern formation. There will also be discussions of current topics of interest such as tumor growth and angiogenesis, HIV and AIDS, and control of the mitotic clock.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 298. Research in Mathematics. 1-12 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics. Permission of instructor.
MA 311. History of Mathematics I. 3,4 Hours.
Development of mathematical principles and ideas from an historical viewpoint, and their cultural, educational and social significance.
Prerequisites: MA 125 [Min Grade: C] or MA 225 [Min Grade: C]

MA 312. History of Mathematics II. 3 Hours.
Development of mathematical principles and ideas from an historical viewpoint, and their cultural, educational and social significance.
Prerequisites: MA 311 [Min Grade: C]

MA 313. Patterns, Functions and Algebraic Reasoning. 3 Hours.
Problem solving experiences, inductive and deductive reasoning, patterns and functions, some concepts and applications of geometry for elementary and middle school teachers. Topics include linear and quadratic relations and functions and some cubic and exponential functions. Number sense with the rational number system including fractions, decimals, and percents will be developed in problem contexts. An emphasis will be on developing algebraic thinking and reasoning.
Prerequisites: MA 102 [Min Grade: C] or MA 105 [Min Grade: C] or MA 106 [Min Grade: C] or MA 107 [Min Grade: C] or MA 110 [Min Grade: C] or MA 125 [Min Grade: C] or MA 225 [Min Grade: C]

MA 314. Geometric and Proportional Reasoning. 3 Hours.
Problem solving experiences, inductive and deductive reasoning, concepts and applications of geometry and proportional reasoning. Topics include analysis of one-, two- and three-dimensional features of real objects, ratio and proportionally, similarity, and congruence, linear, area, and volume measurement, and the development of mathematically convincing arguments. An emphasis will be on developing geometric and proportional thinking and reasoning.
Prerequisites: MA 313 [Min Grade: C]

MA 315. Probabilistic and Statistical Reasoning. 3 Hours.
Descriptive and inferential statistics, probability, estimation, hypothesis testing. Reasoning with probability and statistics is emphasized.
Prerequisites: MA 313 [Min Grade: C]

MA 316. Numerical Reasoning. 3 Hours.
Develop an understanding of number and improve numerical reasoning skills specifically with regard to place value, number relationship that build fluency with basis facts, and computational proficiency; developing a deep understanding of numerous diverse computational algorithms; mathematical models to represent fractions, decimals and percents; equivalencies and operations with fractions, decimals and percents; number theory including order of operations, counting as a big idea, properties of number, primes and composites, perfect, abundant and significant numbers, and figurate numbers; inductive and deductive reasoning with number.
Prerequisites: MA 313 [Min Grade: C]

MA 317. Extending Algebraic Reasoning. 3 Hours.
Extension of algebraic and functional reasoning to polynomials, rational, exponential, and logarithmic functions; problem-solving involving transfer among representations (equation, graph, table); proof via symbolic reasoning, contradiction, and algorithm; interpretation of key points on graphs (intercepts, slope, extrema); development of facility and efficiency in manipulating symbolic representations with understanding; appropriate use of technology and approximate versus exact solutions; functions as models.
Prerequisites: MA 313 [Min Grade: C]

MA 360. Scientific Programming. 3 Hours.
Programming and mathematical problem solving using Matlab, Python, FORTRAN or C++. Emphasizes the systematic development of algorithms and numerical methods. Topics include computers, floating point arithmetic, iteration, GNU/Linux operating system, functions, arrays, Matlab graphics, image processing, robotics, solving linear systems and differential equation arising from practical situations, use of debuggers and other debugging techniques, and profiling; use of callable subroutine packages like LAPACK and differential equation routines; parallel programming. Assignments and projects are designed to give the students a computational sense through complexity, dimension, inexact arithmetic, randomness, simulation and the role of approximation.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 361. Mathematical Modeling. 3 Hours.
Mathematical modeling using computer software, including spreadsheets, systems dynamics software, and computer algebra systems; connections to calculus and functions are emphasized. Students make presentations to the class; justification of mathematical claims and quality of student presentations are assessed. Quantitative Literacy is a significant component of this course.
Prerequisites: MA 125 [Min Grade: C] or MA 225 [Min Grade: C]

MA 398. Research in Mathematics. 1-12 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Junior standing recommended. Permission of instructor required.

MA 411. Integrating Mathematical Ideas. 3 Hours.
This course will integrate ideas from algebra, geometry, probability, and statistics. Emphasis will be on using functions as mathematical models, becoming fluent with multiple representations of functions, and choosing the most appropriate representations for solving a specific problem. Students will be expected to communicate mathematics verbally and in writing through small group, whole group, and individual interactions.
Prerequisites: (MA 125 [Min Grade: C] or MA 225 [Min Grade: C]) and MA 314 [Min Grade: C] (Can be taken Concurrently) or MA 316 [Min Grade: C]

MA 418. Statistics for Teachers. 3 Hours.
Descriptive and inferential statistics, probability distributions, estimation, hypotheses testing, regression. Writing assignment on a project drawing from the above topics. Quantitative Literacy is a significant component of this course.
Prerequisites: MA 102 [Min Grade: C] or MA 105 [Min Grade: C] or MA 106 [Min Grade: C] or MA 107 [Min Grade: C] or MA 110 [Min Grade: C] or MA 125 [Min Grade: C] or MA 225 [Min Grade: C] or MPL 46

MA 419. Special Topics. 1-4 Hour.
Topics vary; may be repeated for credit.
Prerequisites: MA 125 [Min Grade: C] or MA 225 [Min Grade: C]

MA 434. Algebra I: Linear. 3 Hours.
Abstract vector spaces, subspaces, dimension bases, linear transformations, matrix algebra, matrix representations of linear transformations, determinants. MA 260 and MA 434 may not both be counted toward the minor.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]
MA 435. Algebra II: Modern. 3 Hours.
Rings, including the rings of integers and of polynomials, integral
domains, fields and groups. Homomorphism, isomorphism. As time
permits, Galois theory, semi-groups, quotient groups, models, or other
areas of algebra may be included. Students present proofs from a list
of pre-assigned theorems to the class. Logical correctness and proper
mathematical proof-writing style are assessed.
Prerequisites: MA 434 [Min Grade: C] or MA 260 [Min Grade: C]

MA 440. Advanced Calculus I. 3 Hours.
Real numbers, sequences and series, continuity, differential and integral
calculus, exponential and logarithm functions, sine and cosine functions.
Students present proofs from a list of pre-assigned theorems to the class.
Written versions of the proofs are posted for easy access in subsequent
proofs. Logical correctness and proper mathematical proof-writing
style are assessed. Writing and Quantitative Literacy are significant
components of the course.
Prerequisites: MA 227 [Min Grade: C]

MA 441. Advanced Calculus II. 3 Hours.
Real numbers, sequences and series, continuity, differential and integral
calculus, exponential and logarithm functions, sine and cosine functions.
Students present proofs from a list of pre-assigned theorems to the class.
Written versions of the proofs are posted for easy access in subsequent
proofs. Logical correctness and proper mathematical proof-writing
style are assessed. Writing and Quantitative Literacy are significant
components of the course.
Prerequisites: MA 440 [Min Grade: C]

MA 444. Vector Analysis. 3 Hours.
Review and application of multiple integrals; Jacobians and change
of variables in multiple integrals; line and surface integrals; Green,
Gauss, and Stokes theorems, with applications to physical sciences and
computation in spherical and cylindrical coordinates.
Prerequisites: MA 227 [Min Grade: C]

MA 445. Complex Analysis. 3 Hours.
Analytic functions, complex integration and Cauchys theorem, Taylor
and Laurent series, calculus of residues and applications, conformal
mappings.
Prerequisites: MA 227 [Min Grade: C]

MA 453. Transforms. 3 Hours.
Theory and applications of Laplace and Fourier transforms.
Prerequisites: MA 252 [Min Grade: C]

MA 454. Intermediate Differential Equations. 3 Hours.
Topics from among Frobenius series solutions, Sturm-Liouville systems,
nonlinear equations, and stability theory.
Prerequisites: MA 252 [Min Grade: C]

MA 455. Partial Differential Equations I. 3 Hours.
Classification of second order partial differential equations; background
on eigenfunction expansions and Fourier series; integrals and transforms;
solutions of the wave equations, reflection of waves; solution of the
heat equations in bounded and unbounded media; Laplaces equation,
Dirichlet and Neumann problems. Written project reports required.
Quantitative Literacy and Writing are significant components of this
course.
Prerequisites: MA 252 [Min Grade: C]

MA 456. Partial Differential Equations II. 3 Hours.
Classification of second order partial differential equations; background
on eigenfunction expansions and Fourier series; integrals and transforms;
solution of the wave equations, reflection of waves; solution of the heat
equation in bounded and unbounded media; Laplace’s equation, Dirichlet
and Neumann problems.
Prerequisites: MA 455 [Min Grade: C]

MA 461. Modeling with Partial Differential Equations. 3 Hours.
Practical examples of partial differential equations; derivation of partial
differential equations from physical laws; introduction to MATLAB
and its PDE Tool-box, and COMSOL using practical examples; an
overview of finite difference and finite element solution methods;
specialized modeling projects in topics such as groundwater modeling,
scattering of waves, medical and industrial imaging, continuum
mechanics and deformation of solids, Fluid mechanics including
the class boat race, financial derivative modeling, and acoustic and
electromagnetic wave applications. Written project reports required for all
homework assignments. Quantitative Literacy and Writing are significant
components of this course.
Prerequisites: MA 252 [Min Grade: C]

MA 462. Intro to Stochastic Differential Equations. 3 Hours.
Stochastic differential equations arise when random effects are
introduced into the modeling of physical systems. Topics include
Brownian motion and Wiener processes, stochastic integrals and the Ito
calculus, stochastic differential equations, and applications to financial
modeling, including option pricing.
Prerequisites: MA 485 [Min Grade: C]

MA 466. Introduction to Optimization. 3 Hours.
Optimization is important in many decision making problems in various
areas like engineering, economics and machine learning. Optimization
type deals with finding the best solution(s) or variables of a given
objective function. Recently, the area of optimization has received
much attention due to the development of highly efficient computational
methods for data analysis. The scope of this course covers linear
algebra, unconstrained optimization, linear programming, and nonlinear
constrained optimization. The topics include linear algebra, linear
programming convex optimization. The course will also introduce optimization
algorithms and codes via python and matlab.

MA 467. Gas Dynamics. 3 Hours.
Euler’s equations for inviscid flows, rotation and vorticity. Navier-Stokes
equations for viscous flows, hyperbolic equations and characteristics,
rarefaction waves, shock waves and entropy conditions, the Riemann
problem for one-dimensional gas flows, numerical schemes.
Prerequisites: MA 252 [Min Grade: C] and MA 360 [Min Grade: C]

MA 468. Numerical Analysis. 3 Hours.
Introduction to Matlab, integration, interpolation, rational approximation,
splines, numerical methods for ordinary differential equations, ordinary
differential equation modeling, minimization of functions.
Prerequisites: MA 227 [Min Grade: C] or MA 252 [Min Grade: C]

MA 469. Numerical Analysis II. 3 Hours.
Integrals, interpolation, rational approximation, numerical solution of
ordinary differential equations, iterative solution of algebraic equations
in single variable, least squares. Gaussian elimination of solution of linear
equations.
Prerequisites: MA 468 [Min Grade: C]
MA 470. Differential Geometry. 3 Hours.
Theory of curves and surfaces: Frenet formulas for curve, first and second fundamental forms of surface; global theory; abstract surfaces, manifolds, Riemannian geometry.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 472. Geometry I. 3 Hours.
The axiomatic method; Euclidean geometry including Euclidean constructions, basic analytic geometry, transformational geometry, and Klein's Erlangen Program. Students present proofs from a list of pre-assigned theorems to the class. Logical correctness and proper mathematical proof-writing style are assessed.
Prerequisites: MA 125 [Min Grade: C] or MA 225 [Min Grade: C]

MA 473. Geometry II. 3 Hours.
Analytical geometry, Birkhoff's axioms, and the complex plane; structure and representation of Euclidean isometries; plane symmetries; non-Euclidean (hyperbolic) geometry and non-Euclidean transformations; fractal geometry, algorithmic geometry. Course integrates intuition/exploration and proof/explanation.
Prerequisites: MA 472 [Min Grade: C] and (MA 260 [Min Grade: C] or MA 434 [Min Grade: C])

MA 474. Introduction to Topology I. 3 Hours.
Essence and consequences of notion of continuous function developed. Topics include metric spaces, topological spaces, compactness, connected-ness, and separation.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 475. Introduction to Topology II. 3 Hours.
Essence and consequences of notion of continuous function developed. Topics include metric spaces, topological spaces, compactness, connected-ness, and separation.
Prerequisites: MA 474 [Min Grade: C]

MA 480. Introduction to Statistics. 3 Hours.
Descriptive and inferential statistics, probability distributions, estimation, hypothesis testing. Recommended that two years of high school algebra or MA 102 has been completed before taking course. MA 480 does not count toward any math major or minor.

MA 484. Mathematical Finance. 3 Hours.
Prerequisites: MA 434 [Min Grade: C] or MA 435 [Min Grade: C] or MA 260 [Min Grade: C]) and (MA 485 [Min Grade: C] or MA 585 [Min Grade: C])

MA 485. Probability. 3 Hours.
Probability spaces, combinatorics, conditional probabilities and independence, Bayes rule, discrete and continuous distributions, mean value and variance, moment generation function, joint distributions, correlation, Central Limit Theorem, Law of Large Numbers, random walks, Poisson process.
Prerequisites: MA 126 [Min Grade: C] or MA 226 [Min Grade: C]

MA 486. Mathematical Statistics. 3 Hours.
Sampling techniques and data analysis, simulation, Point estimation, Confidence intervals, sufficient statistics, Rao-Cramer lower bound, Tests for binomials, Tests for normals, Goodness-of-fit test, Contingency tables, Two factor analysis, Regression, Order statistics, Nonparametric methods: Wilcoxon test, Run test, and Kolmogorov-Smirnov test. A computer project that involves a written report. Quantitative Literacy and Writing are significant components of this course.
Prerequisites: MA 485 [Min Grade: C]

MA 490. Mathematics Seminar. 1-3 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites Permission of instructor.

MA 491. Special Topics in Mathematics. 1-3 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics.

MA 492. Special Topics in Mathematics. 1-3 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics.

MA 493. Special Topics in Mathematics. 1-3 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics.

MA 494. Special Topics in Mathematics. 1-6 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics.

MA 495. Special Topics in Mathematics. 1-6 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics.

MA 496. Special Topics in Mathematics. 1-12 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics.

MA 497. Research Methods in Mathematics. 1-3 Hour.
Through experience in designing and carrying out investigations, learn how scientists and mathematicians gain knowledge, evaluate scientific and mathematical claims when they conduct, and design and carry out investigations to answer new questions. Work is closely coordinated with the work of students from other content disciplines so that students see the similarity and differences of research methods in their own field as compared with those of science and mathematics inquiry as a whole. Enrollment in UABTeach is required.
Prerequisites: MA 125 [Min Grade: C] or MA 225 [Min Grade: C]

MA 498. Research in Mathematics. 1-12 Hour.
This course covers special topics in mathematics and the applications of mathematics. May be repeated for credit when topics vary. Prerequisites vary with topics. Senior standing recommended.

MA 499. Honors Research in Mathematics. 1-12 Hour.
Mentored research in mathematics leading to a written research report and a public presentation in the form of a talk or poster. Admission restricted to students admitted to Honors in Mathematics. Permission of instructor required.