MATHEMATICS (MATH)

MATH 1105 College Algebra with Business Applications. (Formerly 105) A survey of algebra, functions, graphs, and linear equations as applied to problems in economics and business. Topics include mathematics of finance, linear, polynomial, exponential, and logarithmic functions. Credit will not be granted for both MATH 1105 and MATH 1110 when both courses are taken at Benedictine University. Prerequisite: Placement exam or a “C” or better in MATH 0095. 3 semester credit hour/s.
Designation: Quantitative Reasoning
Campus: LISLE (Typically Offered: Periodically)
MESA (Typically Offered: Periodically)

MATH 1108 Mathematics for Everyday Life. (Formerly 108) Develops conceptual understanding and computational skills in unit analysis, uses of percentages, and dealing with quantities and their magnitudes. Includes formulas of finance for simple interest, compound interest, and loan payments; principles of counting; fundamentals of probability; and estimation and approximation techniques to judge the reasonableness of answers. Also includes representing and analyzing data using statistical tools such as histograms; measures of central tendency; variance and standard deviation; linear regression and scatter plots; normal distributions; and margin of error and confidence intervals. 3 semester credit hour/s.
Designation: Quantitative Reasoning
Campus: LISLE (Typically Offered: Fall and Spring Terms)
MESA (Typically Offered: Spring Term)

MATH 1110 College Algebra. (Formerly 110) This course will focus on using functions and equations to model real-world phenomena. Topics include equations, inequalities, functions, graphs, polynomial and rational functions, exponential and logarithmic functions, conics, systems of equations and inequalities, and finding regression curves using technology. Students who do not place into MATH 1110 will be required to enroll in a "Supplemental Review" section which meets for an extra hour per week. Credit will not be granted for more than one of MATH 1105 and MATH 1110 when both courses are taken at Benedictine University. Prerequisite: Placement exam or a “C” or better in MATH 95 or equivalent course. 3 semester credit hour/s.
Designation: Quantitative Reasoning
Campus: LISLE (Typically Offered: Fall, Spring, and Summer Terms)
MESA (Typically Offered: Fall, Spring, and Summer Terms)

MATH 1111 College Trigonometry. (Formerly 111) General study of the trigonometric functions and their graphs, trig identities, and equations, inverse trig functions, applications of trigonometry, vectors, polar coordinates, and parametric equations. Prerequisite: Placement exam or a “C” or better in MATH 1105 or MATH 1110. 3 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall and Spring Terms)
MESA (Typically Offered: Fall and Spring Terms)

MATH 1112 Mathematics for Elementary Teachers I. This course deeply explores the mathematical content of elementary school mathematics. Topics include mathematical thinking and processes, problem solving, numeration, arithmetic operations, estimation, number theory, integers, fractions, rational numbers, decimals, real numbers, proportions, and percentages. This course is the first of two mathematics courses required of all Elementary Education majors. Prerequisite: Placement exam or "C" or better in MATH 95. 3 semester credit hour/s.
Designation: Quantitative Reasoning
Campus: LISLE (Typically Offered: Fall Term)

MATH 1115 Business Calculus. (Formerly 115) A survey of mathematical techniques used in the managerial, social and life sciences. Topics include systems of linear equations and matrices, linear programming, differential calculus, and applications of the derivative. Prerequisite: Placement exam or a "C" or better in MATH 1105 or MATH 1110. 3 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

MATH 1131 Mathematical Explorations. (Formerly 131). This course explores math as it intersects with art, culture and other aspects of modern life. It discusses the masterpieces of mathematics, highlights its beauty and elegance, its strength and value in our everyday life, how it has changed the course of history, and how it continues to shape the modern world. Prerequisite: "C" or better in MATH 1105, 1108, 1110 or 1112 or math placement above basic skills. 3 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall Term)

MATH 1150 Introduction to Statistics. (Formerly 150) Basic course in statistical techniques which includes representations of data, measures of central tendency, methods of counting, probability, sampling, estimation, hypothesis testing, correlation, and regression. For non-business majors. Prerequisite: "C" or better in MATH 1105, MATH 1108 or MATH 1110 or placement in a course above Basic Skills. Credit will not be given for both MATH 1150 and BALT 1150. IAI M1902. 3 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall and Spring Terms)
MESA (Typically Offered: Fall Term)

MATH 1152 Calculus II. (Formerly 152) Offered through IIT. 5 semester credit hour/s.
Campus: LISLE

MATH 1170 Introduction to Calculus I. (Formerly 170) An introduction to limits and differentiation. Topics in algebra, functions, and trigonometry will be reviewed as necessary for calculus. Further study includes the chain rule, Newton's approximations, plane analytic geometry, and applications of velocity and marginal cost. Prerequisite: Placement exam or a "C" or better in MATH 1111. 4 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Periodically)

MATH 2200 Applications of Calculus I. (Formerly 200) A continuation of MATH 1170. Topics include curve sketching, plane analytic geometry, maxima and minima, related rates, and other applications of the derivative. Study concludes with definite and indefinite integrals, numeric integration, elementary differential equations, parametric functions, mean value theorem and the Fundamental Theorems of Integral Calculus. Credit will not be granted for both MATH 2200 and MATH 2210. Prerequisite: “C” or better in MATH 1170. 4 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Periodically)

MATH 2210 Calculus I. (Formerly 210) Topics include differentiation, and anti-differentiation of algebraic, trigonometric and transcendental functions, the Fundamental Theorem of Calculus, the Mean Value Theorem, optimization, plane analytic geometry, and simple differential equations. Credit will not be granted for both MATH 2210 and MATH 2200. Prerequisite: Placement exam or "C" or better in MATH 1111. IAI M1900-1; MTH901. 4 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall, Spring, and Summer Terms)
MESA (Typically Offered: Periodically)

MATH 2211 Calculus II. (Formerly 211) Topics include applications of the definite integral, methods of integration, L'Hopital's rule, sequences and series, vectors, and numerical integration. Prerequisite: "C" or better in MATH 2210 or MATH 2200. IAI M1900-2; MTH 902. 4 semester credit hour/s.
Designation: -
Campus: LISLE (Typically Offered: Fall and Spring Terms)
MESA

MATH 2212 Calculus III. (Formerly 212) Topics include solid analytic geometry and vectors, partial differentiation, multiple integrals, and vector calculus. Prerequisite: "C" or better in MATH 2211. IAI M1900-3; MTH903. 4 semester credit hour/s.
Designation: -
Campus: LISLE (Typically Offered: Fall and Spring Terms)

MATH 2222 Mathematics for Elementary Teachers II. (Formerly 222) This course deeply explores the mathematical content of elementary school mathematics. Topics include basic concepts of geometry, two- and three-dimensional geometric figures, transformational geometry, coordinate geometry, symmetry, tessellations, similarity, and measurement. This course is the second of a sequence of mathematics courses required of all Elementary Education majors. MATH 1112 and MATH 2222 together satisfy IAI M1903. Prerequisite: "C" or better in MATH 1112. 3 semester credit hour/s.
Designation: -
Campus: LISLE (Typically Offered: Spring Term)

MATH 2229 Biostatistics. (Formerly BIOL 2229) A quantitative approach to biology; emphasis is on the design and analysis of biological experiments. Topics covered include fundamentals of probability, discrete and continuous distributions, one and two sample confidence intervals, hypothesis testing, nonparametric methods, linear regression, and one-way ANOVA. Statistical software will be utilized to analyze data. Prerequisites: "C" or better in MATH 1110, "C" or better in BIOL 1195, BIOL 1197 or BIOL 2297, BIOL 1198, and BIOL 1199 or BIOL 2299, and "C" or better in CHEM 1113 and CHEM 1123. 3 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall and Spring Terms)

MATH 2240 Discrete Mathematics. (Formerly 240) Basic concepts of finite and discrete algebraic structures, with emphasis on applications in computer science. Sets, relations, and functions, Boolean algebra, computer arithmetic, combinatorics, matrix algebra, directed and undirected graphs, and methods of proof. Prerequisite: "C" or better in MATH 1111, MATH 1115, or MATH 1170, or placement or credit in MATH 2210. IAI M1905; CS915. 4 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall and Spring Terms)
MESA (Typically Offered: Spring Term)

MATH 2260 Differential Equations. (Formerly 260) An introduction to first and second order ordinary differential equations (ODEs) with an emphasis on linear ODEs and the methods used to solve them; integrating factor method; various applications of ODEs; slope fields; phase plane analysis; stability of equilibrium solutions; separation of variables; exact ODEs; the Wronskian; existence and uniqueness of solutions; reduction of order; undetermined coefficients; variation of parameters; systems of first order linear ODEs and the eigenvalue/eigenvector method; nonlinear systems; locally linear systems and stability analysis; and the Laplace transform. Prerequisite: "C" or better or co-registration in MATH 2212. IAI MTH912 4 semester credit hour/s.
Designation: Writing Intensive
Campus: LISLE (Typically Offered: Spring Term)

MATH 2297 Introduction to Mathematical Research. (Formerly 297) An introduction to original mathematics research conducted under the supervision of a faculty member. Department Consent required. 0 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 0. Department Consent Required.
Campus: LISLE (Typically Offered: Periodically)

MATH 2298 Introduction to Mathematical Research. (Formerly 298) An introduction to original mathematics research conducted under the supervision of a faculty member. 1-2 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 5. Department Consent Required.
Campus: LISLE (Typically Offered: Periodically)

MATH 3300 Linear Algebra. (Formerly 300) This course serves as an introduction to more abstract mathematics courses. In addition to the theory of Linear Algebra students will learn methods of proof. Topics include matrix algebra, theory of determinants, introduction to vector spaces, linear independence and span, and properties of linear transformations on finite dimensional vector spaces. Prerequisite: "C" or better in MATH 2240 or credit or co-registration in MATH 2212 . 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Spring Term)

MATH 3310 Modern Geometry. (Formerly 310) Euclidean and non-Euclidean geometries, geodesics, triangle congruence theorems, area and holonomy, parallelism, symmetry, and isometries. Prerequisite: "C" or better in MATH 2211. 3 semester credit hour/s.
Designation: Writing Intensive
Campus: LISLE (Typically Offered: Fall Term, Odd Years)

MATH 3350 Complex Variables. (Formerly 350) Complex numbers and their geometric representation, analytic functions, elementary functions, transformations, complex integration, Taylor and Laurent series, and the calculus of residues, conformal mapping, and applications to hyperbolic geometry. Prerequisite: "C" or better in MATH 2212. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Periodically)

MATH 3361 Fourier Analysis & Boundary Value Problems. (Formerly 361) Fourier series and their applications; Fourier Integral Representation; Sturm-Liouville Problems; techniques for solving partial differential equations (PDE's); heat equation, wave equation, and potential equation in Cartesian, polar, and cylindrical coordinates; Laplacian operator; and Bessel functions and their applications. Prerequisite: "C" or better in MATH 2260. 3 semester credit hour/s.
Designation: Engaged Learning
Campus: LISLE (Typically Offered: Periodically)

MATH 3370 Theory of Interest. (Formerly 370) Topics include measurement of interest, various types of annuities, yield rates, amortization schedules, sinking funds, bonds, and securities. Prerequisite: "C" or better in MATH 2211. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term, Odd Years)

MATH 3371 Probability and Statistics I. (Formerly 371) Discrete and continuous probability distributions, moments and mathematical expectation, moment generating functions, conditional probability and expectation, and multivariate distributions. Prerequisite: Credit or co-registration in MATH 2212. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term, Even Years)

MATH 3385 Introduction to Modern Cryptology. (Formerly 385) Cryptology concerns communicating in the presence of an adversary, with goals like preservation of privacy and integrity of communicated data. Topics include rigorous mathematical description of various asymmetric (i.e., private key) and symmetric (i.e., public key) cryptographic methods including substitution ciphers, block ciphers, RSA, the discrete logarithm problem, and other applications, with emphasis on "provable security". Prerequisite: "C" or better in MATH 2212 or MATH 2240. 3 semester credit hour/s.
Designation: Engaged Learning
Campus: LISLE (Typically Offered: Spring Term, Even Years)

MATH 3390 Selected Topics. (Formerly 390) Lectures on miscellaneous topics with which the student has not become acquainted in formal course work. May be an extension of, or a supplement to, material previously encountered, or material from a completely new area. 3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 6. Department Consent Required.
Campus: LISLE (Typically Offered: Periodically)

MATH 3395 Independent Study. (Formerly 395) Designed to encourage superior students to continue the study of mathematics beyond the scope of undergraduate course offerings, through guided independent study. 1-3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 6. Department Consent Required.
Campus: LISLE (Typically Offered: Periodically)

MATH 3397 Mathematical Research. (Formerly 397) Original research in mathematics or mathematics education conducted under the supervision of a faculty member. Prerequisite: "C" or better in MATH 2211. 1-3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 5. Department Consent Required.
Designation: Engaged Learning
Campus: LISLE (Typically Offered: Periodically)

MATH 4331 Abstract Algebra I. (Formerly 331) Rings and elementary theory of rings: integral domains, fields, homomorphism, isomorphism, polynomial rings, quotient rings and ideals. This course also includes an introduction to other algebraic groups and the elementary theory of groups: subgroups, isomorphism, Lagrange's theorem, normal subgroups, and quotient groups. Prerequisite: "C" or better in MATH 2240 or MATH 3300. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term, Odd Years)

MATH 4332 Abstract Algebra II. (Formerly 332) Euclidean Domains, Principal Ideal Domains, Unique Factorization domains, Field Extensions, Galois Theory, and Sylow Theorems. Other topics on application of abstract algebra will also be included. Prerequisite: "C" or better in MATH 4331. 3 semester credit hour/s.
Designation: Writing Intensive; Engaged Learning
Campus: LISLE (Typically Offered: Periodically)

MATH 4341 Real Analysis I. (Formerly 341) Topological properties of Euclidean spaces, limits of sequences and functions and continuity and differentiability for functions of one variable. Prerequisite: "C" or better in MATH 2212, and "C" or better in MATH 2240 or MATH 3300. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term, Even Years)

MATH 4342 Real Analysis II. (Formerly 342) Integrability, sequences of functions and infinite series. Prerequisite: "C" or better in MATH 4341. 3 semester credit hour/s.
Designation: Writing Intensive; Engaged Learning
Campus: LISLE (Typically Offered: Periodically)

MATH 4373 Probability and Statistics II. (Formerly 373) Sampling distributions, estimation, tests of hypotheses, least squares regression, correlation, introduction to Bayesian analysis and analysis of variance. Prerequisite "C" or better in MATH 3371. 3 semester credit hour/s.
Designation: Writing Intensive; Engaged Learning
Campus: LISLE (Typically Offered: Spring Term, Odd Years)

MATH 4390 Selected Topics. Lectures on miscellaneous topics with which the student has not become acquainted in formal course work. May be an extension of, or supplement to, material previously encountered, or material is from a completely new area. Prerequisite: MATH 3300. 3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 6.
Campus: LISLE (Typically Offered: Periodically)

MATH 4395 Independent Study. Designed to encourage superior students to continue the study of mathematics beyond the scope of undergraduate course offerings, through guided independent study. 1-3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 6.
Campus: LISLE (Typically Offered: Periodically)

MATH 4399 Mathematics Seminar. This course is intended to introduce students to mathematics exploration, research, and public speaking. In addition, the course will expose students to some mathematical notions not taught in the standard courses already included in the curriculum. The course will help fulfill both the Math Major and the Math Minor Requirements. Prerequisite: "C" or better in MATH 3300 and Consent of Instructor. 3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 6. Department Consent Required.
Designation: Writing Intensive; Engaged Learning
Campus: LISLE (Typically Offered: Spring Term)

MATH 4400 Data Science Capstone. A team oriented project that involves mining and analyzing a large data set. To complete the project, students will draw on their cumulative knowledge of computer science and mathematics. Prerequisite: Senior standing and department chair consent. 3 semester credit hour/s. Department Consent Required.
Designation: Engaged Learning
Campus: LISLE (Typically Offered: Periodically)

MATH 95 Intermediate Algebra. Topics include real numbers, linear equations, exponent, polynomials, rational expressions, radicals, and quadratic equations. Prerequisite: Placement exam (Traditional Students Only). 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall and Spring Terms)
MESA (Typically Offered: Periodically)