MATHEMATICS AND COMPUTATIONAL SCIENCES

Programs

- Computer Information Systems, Bachelor of Science (http://catalog.ben.edu/lisle-undergraduate/academic-programs/mathematics-computational-sciences/computer-information-systems-bs/)
- Computer Science, Bachelor of Science (http://catalog.ben.edu/lisle-undergraduate/academic-programs/mathematics-computational-sciences/computer-science-bs/)
- Data Science, Bachelor of Science (http://catalog.ben.edu/lisle-undergraduate/academic-programs/mathematics-computational-sciences/data-science-major/)
- Mathematics, Bachelor of Science (http://catalog.ben.edu/lisle-undergraduate/academic-programs/mathematics-computational-sciences/mathematics-bs/)
- Computer Science, Minor (http://catalog.ben.edu/lisle-undergraduate/academic-programs/mathematics-computational-sciences/computer-science-minor/)
- Mathematics, Minor (http://catalog.ben.edu/lisle-undergraduate/academic-programs/mathematics-computational-sciences/mathematics-minor/)
- Computer Information Systems, Minor (http://catalog.ben.edu/lisle-undergraduate/academic-programs/mathematics-computational-sciences/computer-information-systems-minor/)

Courses

Computer Science

CMSC 1180 Introduction to Computing. (Formerly 180) An introduction to the fundamental principles of computing and the computers relevance and impact on the world today with an overriding theme of algorithms. Topics include hardware, software, data representation, networks, and databases with applications in simulation, modeling, electronic commerce and artificial intelligence. 2 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

CMSC 1181 Visual Programming Laboratory. (Formerly 181) Provides programming fundamentals, with applications developed in a visual programming language. Programming topics include variables, formatted output, looping, conditional execution, subroutines and functions. Co-registration or credit in CMSC 1180. 1 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Periodically)

CMSC 1182 Science Applications Laboratory. (Formerly 182) A laboratory experience for all students interested in analyzing, processing, graphing, displaying, and presenting scientific data through the use of spreadsheet software (Microsoft Excel). Co-registration or credit in CMSC 1180. 1 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall Term)

CMSC 1184 Microsoft Excel Laboratory. (Formerly 184) Introduction to the software application of spreadsheets using Microsoft Excel. Designed for students interested in manipulating, organizing, analyzing, and presenting numerical data and information within the context of business applications. Co-registration or credit in CMSC 1180. 1 semester credit hour/s.
Designation: -
Campus: LISLE (Typically Offered: Periodically)
MESA (Typically Offered: Periodically)

CMSC 1185 Python Programming Laboratory. (Formerly 185) An introduction to the fundamentals of programming in Python for students interested in engineering, physics, and computer science. Programming topics include problem solving, variables, calculations, I/O, conditions, looping, and functions. Co-registration or credit in CMSC 1180. 2 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

CMSC 1186 Web Development Laboratory. (Formerly 186) An introduction to the fundamentals of web design and implementation of client side web applications geared for students in the arts,humanities and education. Topics include HTML and JavaScript for webpage design and interactive applications. 1 semester credit hour/s.
Designation: -
Campus: LISLE (Typically Offered: Periodically)

CMSC 2200 Computer Programming. (Formerly 200) An introduction to software design, algorithm development and implementation in a high-level programming language. Elementary programming structures, methods, string processing and functions, and file processing. Functional design and programming, real world and application modeling, testing and debugging. Prerequisites: MATH 1105, MATH 1110, or placement in a course above Basic Skills. IAI CS911 3 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Spring Term)
MESA (Typically Offered: Spring Term)

CMSC 2205 Data Structures and Algorithms I. (Formerly 205) The study of data structures, their applications and implementations including two dimensional arrays, classes, lists, stacks, queues, and linked lists. Introduction to object-oriented programming, exception handling and unit testing. Prerequisite “C” or better in CMSC 2200. IAI CS912 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

CMSC 2220 Computer Architecture. (Formerly 220) A breadth course in computer architecture including logic design, CPU organization, integer and floating point representations, instruction representation, pipelining, and memory hierarchy. Prerequisite: “C” or better in CMSC 2200. 3 semester credit hour/s.
Designation: -
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

CMSC 2264 Introduction to Web Application Development. (Formerly 264) An introduction to modern web application development with a focus on the client-side and an introduction to server-side fundamentals. Prerequisite: “C” or better in CMSC 2200. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Spring Term)
MESA (Typically Offered: Spring Term)

CMSC 2330 Introduction to Database Systems. Introduces the fundamentals of database management systems, SQL, query processing and optimization. Prerequisite: "C" or better in MATH 1105, MATH 1110, or placement in a course above Basic Skills. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

CMSC 2365 Introduction to Computer Networks. Introduces fundamental concepts in the design and implementation of computer networks and protocols, as well as various applications. Prerequisite: "C" or better in CMSC 2200. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Spring Term)
MESA (Typically Offered: Spring Term)

CMSC 3270 Data Structures and Algorithms II. (Formerly 270) The further study of data structures including trees, heaps, and graphs. Sorting algorithms, hashing, and recursion. Algorithm analysis techniques. Prerequisite: "C" or better in both CMSC 2205 and MATH 2240. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

CMSC 3274 Object-Oriented Design and Programming. (Formerly 274) Design and implementation of object-oriented applications through the use of Java programming language. Includes classes, inheritance, encapsulation, polymorphism, interfaces, graphical user interface, nested classes, generics, abstract classes, reflection, multithreading, UML, and design patterns. Prerequisite: "C" or better in CMSC 2205 and "C" or better in MATH 2240. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

CMSC 3301 Technical Communications. (Formerly 301) A focus on communication from both an oral and a written perspective within a purely technical environment. Topics include client/customer requirements gathering, project leadership, and detailed application documentation intended for various audiences. Prerequisite: "C" or better in CMSC 3274. 3 semester credit hour/s.
Designation: Writing Intensive
Campus: LISLE (Typically Offered: Spring Term)
MESA (Typically Offered: Spring Term)

CMSC 3303 Computer Science Ethics. Discussion of various case studies in computer science, in order to examine complex ethical issues in the technological environment. Prerequisite: "C" or better in CMSC 3301 1 semester credit hour/s.
Campus: LISLE (Typically Offered: Spring Term)
MESA (Typically Offered: Spring Term)

CMSC 3330 Database Management Systems. (Formerly 330) Database design and implementation including the relational and non-relational data models, ER diagrams, relational algebra, functional dependency theory, normalization techniques, concurrency control, recovery, and security. Prerequisite: "C" or better in CMSC 3274. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Spring Term)
MESA (Typically Offered: Spring Term)

CMSC 3387 Independent Study. (Formerly 387) Independent Study: Provides an opportunity for an advanced student in the major to pursue study in a computer science topic of interest outside of the current curriculum. 1-3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 6.
Campus: LISLE (Typically Offered: Periodically)
MESA (Typically Offered: Periodically)

CMSC 3391 Current Topics in CS. Covers a variety of current topics in computing that are not otherwise addressed in the curriculum. Topics will vary each time the course is offered due to the nature of the material covered. Prerequisite: "C" or better in CMSC 3301. 2 semester credit hour/s.
Campus: LISLE
MESA

CMSC 3396 ACCA Seminar. (Formerly 396) Evening seminar at Associated Colleges of Chicago Area schools dealing with advanced topics in computer science. Topics are announced in advance. 1 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 3. Department Consent Required.
Campus: LISLE (Typically Offered: Fall Term)

CMSC 3397 Undergraduate Project. (Formerly 397) Independent work on a project supervised by a faculty member in the program. 1-3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 12.
Designation: Engaged Learning
Campus: LISLE (Typically Offered: Periodically)

CMSC 3399 Internship. (Formerly 399) Practical experiences in computer science related fields under the supervision of the program. Prerequisite: GPA 3.00 in computer science course work. 1-6 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 12. Department Consent Required.
Designation: Engaged Learning
Campus: LISLE (Typically Offered: Periodically)
MESA (Typically Offered: Periodically)

CMSC 4310 Operating Systems. (Formerly 310) An introduction to operating systems including the topics of processes, threads, synchronization, CPU scheduling, deadlocks, memory management, virtual memory, and distributed systems. Prerequisites: "C" or better in both CMSC 2220 and CMSC 3274. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Spring Term, Odd Years)
MESA (Typically Offered: Spring Term, Odd Years)

CMSC 4363 Data Mining. (Formerly 363) Investigation of data mining techniques and their various applications. Topics include data quality and preprocessing, classification methods, association analysis (attributes and patterns), and cluster analysis (K-means, prototype-based, density-based, and graph based clustering). Prerequisite: "C" or better in CMSC 3270. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term, Even Years)

CMSC 4364 Mobile Commerce. (Formerly 364) Examination of current mobile technologies, including implementation, application, and marketability. Topics include mobile commerce, application design and usability, responsive design, mobile operating systems and database technology, and networking and security. Prerequisites: "C" or better in both CMSC 2205 and CMSC 2264. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Periodically)

CMSC 4365 Computer Networks and Data Communication. (Formerly 365) An introductory course in computer networking and data communications. Discussion is focused on the layers of the Internet Protocol Stack. Prerequisite: "C" or better in both CMSC 2220 and CMSC 3274. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Periodically)
MESA (Typically Offered: Periodically)

CMSC 4370 Algorithm Design and Analysis. (Formerly 370) Methods of designing efficient algorithms including divide and conquer, backtracking, greedy approach, dynamic programming and branch-and-bound. Complexity analysis of algorithms including computational complexity and NP-complete problems. Prerequisite: "C" or better in CMSC 3270. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Periodically)

CMSC 4373 Big Data. (Formerly 373) Introduction to concepts of working with big data. Topics include Map-Reduce, mining data streams, link analysis (PageRank), frequent Itemsets, recommendation system and dimensionality reduction. The course also includes practical exercises implementing big data algorithms. Prerequisite: "C" or better in CMSC 3270. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Spring Term, Odd Years)

CMSC 4374 Advanced Web Application Development. (Formerly 374) An in-depth study of building large-scale Web Applications focusing on the MVC design pattern. Topics include: Application configurations, mobile application development, database APIs, modern application frameworks, and system load testing. Pre-requisites: "C" or better in both CMSC 2264 and CMSC 3274. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term, Odd Years)
MESA (Typically Offered: Fall Term, Odd Years)

CMSC 4375 Software Engineering. (Formerly 375) An introduction to software engineering from project conception to implementation. Students will work in teams to develop multiple software projects throughout the semester practicing various types of software development processes and working in multiple roles within their team. Topics include software development processes (waterfall, Agile, etc.) unit testing, calc overage, requirements elicitation and specification, software documentation, work estimation, and release planning. Prerequisite: “C” or better in both CMSC 3301 and CMSC 3330. 3 semester credit hour/s.
Designation: Writing Intensive
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Fall Term)

CMSC 4380 Artificial Intelligence. (Formerly 380) Problem solving methods such as logic programming and heuristic search strategies are applied to topics such as game playing, pattern recognition, and machine learning. Prerequisite: "C" or better in CMSC 3270. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Spring Term, Even Years)
MESA (Typically Offered: Spring Term, Even Years)

CMSC 4383 Machine Learning. (Formerly 383) Investigation of the design, implementation and application of various machine learning algorithms. Topics include decision trees, artificial neural networks, Bayesian learning, computational learning theory, instance-based learning, and genetic algorithms. Prerequisite: "C" or better in CMSC 3270. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Fall Term, Odd Years)

CMSC 4384 Enterprise Architecture. (Formerly 384) An advanced course in designing, modeling, building and testing software at an enterprise level. Topics include business architectures, enterprise software (network and web services), advanced web frameworks, design methodologies, data processing, cost management, and scalable, multi-tiered, and secure network applications. Prerequisites: "C" or better in both CMSC 3270 and CMSC 4374. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Periodically)

CMSC 4385 Theory of Programming Languages. (Formerly 385) Organization of programming languages analyzed through representative languages. Introduction to concepts of programming language specification and analysis. Includes type issues, scope, subprograms, runtime behavior and models of programming. Prerequisite: "C" or better in CMSC 3274. 3 semester credit hour/s.
Campus: LISLE (Typically Offered: Periodically)

CMSC 4386 Programming Languages Practicum. (Formerly 386) A hands-on experience with current issues in programming languages. A more in-depth view of modern languages such as Perl, C#, VB Script and JavaScript and historical languages such as LISP, Prolog, FORTRAN and COBOL. Prerequisite: Credit or co-registration in CMSC 4385. 1 semester credit hour/s.
Campus: LISLE (Typically Offered: Periodically)

CMSC 4391 Selected Topics. (Formerly 391) Various topics to supplement the curriculum. 3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 12.
Campus: LISLE (Typically Offered: Periodically)
MESA (Typically Offered: Periodically)

CMSC 4398 Capstone Project. (Formerly 398) A team-oriented, software engineering project experience to implement a solution to an information-based problem. Prerequisite: Senior Standing and "C" or better in both CMSC 3330 and CMSC 4375. 3 semester credit hour/s.
Designation: Engaged Learning
Campus: LISLE (Typically Offered: Spring Term)
MESA (Typically Offered: Spring Term)

Mathematics

MATH 1105 Finite Mathematics. (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 95. 3 semester credit hour/s.
Designation: Quantitative Reasoning
Campus: LISLE (Typically Offered: Fall and Spring Terms)

MATH 1108 Quantitative Reasoning. (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. Prerequisite: Placement exam or a “C” or better in MATH 95. IAI M1904 3 semester credit hour/s.
Designation: Quantitative Reasoning
Campus: LISLE (Typically Offered: Fall and Spring Terms)
MESA (Typically Offered: Fall and Spring Terms)

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. 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 95. 3 semester credit hour/s.
Designation: Quantitative Reasoning
Campus: LISLE (Typically Offered: Fall, Spring, and Summer Terms)
MESA

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 The Mathematical Universe. (Formerly 131) This course allows the student to discover the beauty and elegance of mathematics, its strength and value to everyday life. Includes topics such as zero, infinity, fractals, the golden ratio, clock arithmetic, matrices, cryptology, etc., that have helped shape the modern world. Students would be required to understand the techniques discussed to levels that would enable them to think abstractly beyond specific examples covered. Prerequisite: "C" or better in MATH 1105, 1108, 1110 or 1112 or math placement higher than basic skills. 3 semester credit hour/s.
Designation: Computational, Mathematical, and Analytical (QCM)
Campus: LISLE (Typically Offered: Fall Term)
MESA (Typically Offered: Periodically)

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)

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. 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)
MESA (Typically Offered: Spring Term)

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 2212 and 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. Prerequisites will include 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)

Faculty

Faculty

Timothy Comar (2001), Ph.D
Mathematics
Professor, Mathematical and Computational Sciences
Ph.D., 1996, Mathematics, The University of Michigan
Sc.B., 1991, Mathematics, Brown University

Anthony DeLegge (2010), Ph.D.
Department Chair, Mathematics
Professor, Mathematical and Computational Sciences
Ph.D 2010, Mathematics, University of Nebraska-Lincoln
M.S. 2008, Mathematics, University of Nebraska-Lincoln
B.S. 2005, Mathematics, Benedictine University

Hector Hernandez (2022), Ph.D.
Computer Science
Instructor, Mathematical and Computational Sciences
Ph.D, 1987, Computing Science, University of Alberta
M.S., 1979, Mathematics, University of Waterloo
B.S., 1976, Computer Systems Engineering, Monterrey Institute of Technology

Manmohan Kaur (2000), Ph.D.
Mathematics
Professor, Mathematical and Computational Sciences
Ph.D. 2001, Functional Analysis, University of Illinois at Urbana-Champaign
M.S. 1999, Mathematics, University of Illoinois at Urbana-Champaign
M.Phil. 1991, University of Delhi, India

M.A. 1989, Mathematics, University of Delhi, India

Jeremy Nadolski (2004), Ph.D.
Mathematics
Professor, Mathematical and Computational Sciences
Ph.D. 2004, Statistics, University of Kentucky
M.S. 1999, Statistics, University of Kentucky
B.S. 1998, Mathematics, Benedictine University

Ellen Ziliak (2010), Ph.D.
Mathematics
Professor, Mathematical and Computational Sciences
Ph.D. 2010, Mathematics, Colorado State University
M.S. 2006, Mathematics, Colorado State University
B.S. 2004, Mathematics, University of Evansville

Lecturers

Marian Flattum, M.S.
Lecturer, Mathematics

Daniel Geiger, Ph.D.
Lecturer, Mathematics

Ken Leszczynski, M.S.
Lecturer, Mathematics

Anna Makarov, Ph.D.
Lecturer, Mathematics

Kathleen Ramsey, M.A.
Lecturer, Mathematics

The lecturers listed are individuals who have been employed as instructors on an as-needed basis, within the last several years, to teach courses at Benedictine University. Instructors listed may not currently be employed by Benedictine University. The University is fortunate to be able to provide our students with part-time faculty whose experience, credentials and commitment to education add to the high quality of our resident faculty.