

2021-22 ACADEMIC CATALOG



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The minor in mathematics requires a minimum of 18 semester hours. At least 6 semester hours must be selected from courses numbered 300 or higher.

Courses

Minor Requirements

MTH 220 - Calculus I

Calculus I is a standard introductory calculus course: limits and continuity; differentiation; applications of derivatives in a variety of situations; definite and indefinite integration; applications of integrals in a variety of situations; derivatives and integrals of certain transcendental functions. Prerequisites: MTH 140 and MTH 143 with a minimum grade of C or a suitable test score, ACT Math score of 27 (minimum) or equivalent SAT Math score.

Grade Basis: Letter Grade

Credit hours: 4.0

Lecture hours: 4.0

Prerequisites:

- MTH 140 - College Algebra
 - MTH 143 - Trigonometry
-

MTH 222 - Calculus II

Calculus II covers techniques and applications of integration and the calculus of transcendental functions. Prerequisite: MTH 220.

Grade Basis: Letter Grade

Credit hours: 4.0

Lecture hours: 4.0

Prerequisites:

- MTH 220 - Calculus I
-

MTH 223 - Calculus III

Calculus III covers topics in polar coordinates, vector calculus, partial differentiation and multiple integrals. Prerequisite: MTH 222.

Grade Basis: Letter Grade

Credit hours: 4.0

Lecture hours: 4.0

Prerequisites:

- MTH 222 - Calculus II

Any two of the following

MTH 301 - Differential Equations

An investigation into the solution of ordinary equations including, but not limited to, the following: equations of order one via separation of variables, homogeneous coefficients, integrating factors, and substitution; linear equations via matrix methods and differential operators; transform methods; and series solutions. Both analytic and numerical solutions will be considered. Application of methods to the fields of science and mathematics will be an important part of this course. Prerequisite: MTH 222.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 222 - Calculus II
-

MTH 305 - Mathematical Reasoning and Proofs

Transition to advanced mathematics is designed to help students learn the principles of mathematical reasoning and the writing of proofs. It is designed for students planning to take advanced mathematics courses. Topics include active reading of mathematics, problem-solving, logical

reasoning and communication of mathematics, direct and indirect proofs, and proof by induction. Corequisite or prerequisite: MTH 222.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 222 - Calculus II
-

MTH 310 - Linear Algebra

This first course in abstract mathematics also covers topics which have powerful practical applications. Linear algebra is a study of linear equations and systems of linear equations. A variety of types of examples of equations and systems is considered for the development of concepts, theory and computation skills (solving systems of linear equations), matrices and vector spaces as abstract expressions of equations. Systems are studied in depth as they relate to linear equations. Prerequisite: MTH 220 with a minimum grade of C.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 220 - Calculus I
-

MTH 315 - Mathematical Statistics I

Mathematical Statistics is a calculus-based treatment of probability, random variables, discrete and continuous distributions, conditional probability, independence, moment generating functions, limit theorems, and estimation. Prerequisite: MTH 223.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 223 - Calculus III
-

MTH 316 - Mathematical Statistics II

Transformations, order statistics, point estimation, sufficient statistics, Rao-Blackwell Theorem, delta method, confidence intervals, likelihood ratio tests, applications. Prerequisite: MTH 315.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 315 - Mathematical Statistics I
-

MTH 320 - Discrete Mathematics

This course studies the mathematical elements of computer science including propositional logic, predicate logic, sets, functions and relations, combinatorics, mathematical induction, recursion, relations, algorithms, matrices, graphs, trees, Boolean logic, and algebraic structure, with applications. As a beginning course in abstract thinking, this course will lay a basic foundation for mathematical proofs. During the course of the semester, students will learn to recognize and express mathematical ideas graphically, numerically, symbolically, and in writing. Prerequisite: MTH 220 with a minimum grade of C.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 220 - Calculus I
-

MTH 401 - Abstract Algebra I

This course offers a study algebraic structures, beginning with groups. Group theory topics include permutation groups, cyclic groups, subgroups, normal subgroups, co-sets, quotient groups, group homomorphisms, Cayley's and Sylow's Theorems. The course includes an introduction to the algebraic structure of rings, including the topics of subrings, ideals, ring homomorphisms, and polynomial rings. This course emphasizes proof and connecting the abstract back to the concrete. Prerequisite: MTH 305 with a minimum grade of C.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 305 - Mathematical Reasoning and Proofs
-

MTH 402 - Abstract Algebra II

This course is a continuation of MTH 401 focusing on integral domains and fields. Topics include integral domains, ordered integral domains, vector spaces, quotient fields, finite fields, real and complex numbers, field extensions, constructability, and roots of polynomials. Prerequisite: MTH 401.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 401 - Abstract Algebra I
-

MTH 405 - Real Analysis I

This course introduces the student to a rigorous development of the real number system and theory of calculus. Topics include the real number system, sequences and series, limits and continuity, the derivative, properties of continuous functions and some theorems of calculus. Prerequisites: MTH 223 and MTH 305 with a minimum grade of C.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 223 - Calculus III
 - MTH 305 - Mathematical Reasoning and Proofs
-

MTH 406 - Real Analysis II

This course is a continuation of MTH 405. Topics include infinite series, sequences and series of functions, uniform convergence, and the theory of integration. Prerequisites: MTH 405.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 405 - Real Analysis I
-

MTH 408 - Number Theory

Classical number theory which includes divisibility, prime numbers, congruencies, primitive roots, Diophantine equations, theorems of Fermat, and quadratic reciprocity, along with historical background for various problems are studied. Prerequisite: MTH 305 with a minimum grade of C.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

Prerequisites:

- MTH 305 - Mathematical Reasoning and Proofs

MTH 498 - Senior Seminar

A capstone experience for mathematics majors in which students develop an individual research project. Each student in conversation with the seminar leader and other faculty members will present the research project to the campus community. Prerequisite: senior standing.

Grade Basis: Letter Grade

Credit hours: 3.0

Lecture hours: 3.0

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