

MATHEMATICS (MAT)

MAT 501 MATH FOR TEACHERS: ALGEBRA

3, 3/0

Prerequisite: 24 credit hours of undergraduate mathematics. Operational systems, number systems, groups, rings, fields, ordered fields, functions over fields, algebraic properties of the trigonometric functions.

MAT 521 MATH FOR TEACHERS: GEOMETRY

3, 3/0

Formal and informal geometry, congruence, measurement, constructions, similarity, transformations, coordinate geometry, trigonometric functions.

MAT 552 MATHEMATICS FOR TEACHERS: NUMBER THEORY

3, 3/0

Prerequisites: MAT 121 and MAT 122. Structure of the integers; divisibility; primes; congruence classes; linear congruences; Diophantine equations; Fibonacci numbers; selected topics.

MAT 581 MATHEMATICS FOR TEACHERS: PROBABILITY AND STATISTICS

3, 3/0

Prerequisites: Two semesters of calculus and MAT 325 or MAT 311 or equivalent. Probability, probability distributions, sampling, design of experiments, hypothesis testing, regression, analysis of variance, nonparametric statistics.

MAT 587 TOPICS IN MATHEMATICS

3, 3/0

In-depth examination of rapidly and significantly changing disciplinary issues, topics, or practices; offered occasionally.

MAT 588 TOPICS COURSE

3, 3/0

MAT 590 INDEPENDENT STUDY

1-3, 0/0

MAT 593 MATHEMATICS FOR TEACHERS: DISCRETE MATHEMATICS

3, 3/0

Prerequisites: MAT 121 and MAT 122. Partitions; permutations; probability measure; conditional probability; vectors; matrices; operations and properties; linear programming applications.

MAT 598 MICROCOURSE

1-3, 1/0

Examination of significant disciplinary issues, topics, or practices

MAT 601 TOPICS IN MODERN ALGEBRA

3, 3/0

Prerequisite: Acceptance to the mathematics master's degree program. Groups, semigroups, and monoids; homomorphisms; subgroups and cosets; Abelian groups; the symmetric group; actions and the Sylow theorems; rings, subrings, and ideals; ring homomorphisms; integral domains, division rings, and fields; ring and field extensions; Galois theory.

MAT 611 TOPICS IN REAL ANALYSIS

3, 3/0

Prerequisites: Three semesters of an undergraduate calculus sequence. Real numbers; basic topology; continuous functions; differentiation; the Riemann-Stieltjes integral; sequence and series of functions; some special functions; the Lebesgue theory.

MAT 616 ELEMENTS OF MATHEMATICS, PROGRAMMING AND COMPUTER SCIENCE FOR DATA SCIENCE

3, 3/0

Prerequisite: Instructor permission. Introductory topics in calculus, optimization, linear algebra and discrete mathematics useful for data scientists. Networking concepts relevant to data analytics approached from a mathematical point of view. Mathematical programming to implement a variety of numerical methods. Offered every fall semester.

MAT 620 MODERN GEOMETRY:SELECTED TOPICS 1-3, 1/0

Prerequisite: MAT 322. Foundations; axiomatic projective geometry; real projective geometry; linear projective geometry; finite geometries; non-Euclidean geometries.

MAT 631 FOUNDATIONS OF MATHEMATICS

3, 3/0

Prerequisite: 12 credit hours of mathematics coursework beyond calculus. Axiomatic method; theory of sets and infinite sets; real number system and linear continuum; the complex number system; groups and their significance for the foundations; development of various viewpoints on foundations.

MAT 646 INTRODUCTION TO STATISTICS FOR DATA SCIENCE

3, 3/0

Prerequisite: Instructor permission. Descriptive statistics, probability concepts, discrete and continuous probability distributions, sampling distributions, interval estimation and hypothesis testing of one and two population means, proportions and variances, non-parametric tests, simple linear regression and correlation, one-way analysis of variance. Offered every fall semester.

MAT 651 THEORY OF NUMBERS

3, 3/0

Prerequisite: 12 credit hours of mathematics coursework beyond calculus. Counting and recording of numbers; properties of numbers; Euclid's algorithm; prime numbers; the aliquot parts; indeterminate problems and their theory; Diophantine problems; congruences; analysis of congruences; Wilson's theorem; Euler's theorem; theory of decimal expansions; the converse of Fermat's theorem; the classical construction problems.

MAT 670 DISCRETE MATHEMATICS AND FOUNDATIONS OF COMPUTER SCIENCE

3, 3/0

Prerequisite: Acceptance to the mathematics master's degree program. Problems, theorems, and discrete structures commonly used in mathematics and computer science; mathematical analysis of algorithmic/computer solutions to problems in mathematics; mathematical problems that are not solvable by computer.

MAT 681 INTERMEDIATE PROBABILITY

3, 3/0

Prerequisite: MAT 381. Advanced probability theory; combinatorial analysis; the laws of large numbers; theory of stochastic processes.

MAT 683 STATISTICAL THEORY

3, 3/0

Prerequisite: MAT 381. Probability; estimation; confidence sets; tests of hypotheses; decision theory; Bayesian methods; linear models; nonparametric methods.

MAT 690 MASTER'S PROJECT

3, 3/0

Prerequisite: Written approval of the faculty member and the department chair. Research study or investigation of a mathematical problem or topic, conducted under the guidance of a graduate faculty member of the Mathematics Department.

MAT 695 MASTER'S THESIS

3, 0/0

MAT 696 HISTORY OF MATHEMATICS

3, 3/0

Prerequisite: 12 credit hours of mathematics coursework beyond calculus. Chronological study of the development of mathematics; contributions of nations, ages, or periods; selected biographies, appraisals, and critiques; problem studies.

MAT 699 SELECTED ADVANCED TOPICS

3, 3/0

Prerequisite: Instructor permission. Seminar considering an advanced branch of contemporary mathematics such as combinatorics, game theory, automata theory, or intensive study of an advanced topic in mathematical research.

MAT 701 MODERN ALGEBRA I

3, 3/0

Prerequisite: MAT 301. Cyclic groups; transformation groups; factor groups; groups with operators; isomorphism theorems; composition series; direct products of groups; Sylow theorems; residue class rings; operations on ideals; extensions of rings.

MAT 721 THESIS/PROJECT CONTINUATION

0, 0/0

MAT 722 THESIS/PROJECT EXTENDED

0, 0/0

MAT 795 MASTER'S THESIS

3, 3/0

Individual investigation into an area of mathematics, under the guidance of a faculty member.