



Department of Mathematics

Rhoades Science Center 132

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www.vcsu.edu/departments/mathematics/ (<https://www.vcsu.edu/departments/mathematics/>)

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Mathematics is the foundation for all science, technology, and engineering. Mathematical sophistication is a fundamental skill for a technical society like ours. The VCSU Mathematics Department specializes in the preparation of secondary mathematics teachers. There is plentiful demand in the job market for math teachers. In fact, recent graduates of VCSU's Math Education program have enjoyed 100% job placement over the past 15+ years. The program follows the guidelines of the Council for the Accreditation of Educator Preparation (CAEP) and the North Dakota Education Standards and Practices Board (ESPB).

Program Learning Outcomes

Mathematics and Mathematics Education

1. Content and Computation: Students can demonstrate mathematical proficiency in course-level content-specific learning outcomes for all mathematics courses within the program. This includes the application and demonstration of computational and algorithmic problem-solving techniques.

2. Communication: Students can read, interpret, write about, and talk about mathematics.

3. Technology: Students can use mathematics technologies to represent, create, solve, and analyze mathematical concepts.

Additional Program Learning Outcomes for Math Education

4. Pedagogical Content Knowledge: Students can demonstrate the ability to integrate mathematical content knowledge with knowledge of secondary mathematics standards & curriculum, general pedagogical practices, and knowledge of learners and their characteristics.

5. Dispositions: Students can demonstrate the professional dispositions required of a classroom teacher.

Haut, Jessica (2024) Assistant Professor; B.S.Ed., M.Ed.
Valley City State University

Kosel, Trent (2020) Assistant Professor; B.S. Valley City State University; M.A. Minot State University; M.Ed. North Dakota State University

Noteboom, Benjamin (2022) Assistant Professor; B.S., M.S., Ph.D. North Dakota State University

Wirth, Jamie (2008) Professor; B.A. University of North Dakota, B.S.Ed Mayville State University, M.A. Minot State University, Ph.D. North Dakota State University

Majors

- Mathematics (B.A.,B.S.) (<http://catalog.vcsu.edu/undergraduate-catalog/programs/majors/mathematics/>)
- Mathematics Education (B.S. in Education) (<http://catalog.vcsu.edu/undergraduate-catalog/programs/majors/mathematics-education/>)

Minor

- Mathematics (<http://catalog.vcsu.edu/undergraduate-catalog/programs/minors/mathematics/>)

Associate of Arts

- Associate of Arts - Applied Mathematics for Pre-Engineering Concentration (<http://catalog.vcsu.edu/undergraduate-catalog/programs/associate-arts/applied-math-for-pre-engineering-concentration/>)
- Associate of Arts - Mathematics Concentration (<http://catalog.vcsu.edu/undergraduate-catalog/programs/associate-arts/math-concentration/>)

MATH 103. College Algebra. 3 Credits.

Relations and functions, equations and inequalities, complex numbers; polynomial, rational, exponential and logarithmic functions and systems of equations.

Typically Offered: On sufficient demand.

Prerequisites: Grade of C or better in ASC 93 or 94; or math placement score (NDUS 413.1); or MATH 104, MATH 105, MATH 107, MATH 110, or MATH 210. Corequisite: ASC 98 if math placement score requires it or if grade in ASC 92 or ASC 94 is a C or better.

MATH 104. Finite Mathematics. 3 Credits.

An extension of basic algebra to areas that have applications in the economic, behavior, social, and life sciences. Topics include systems of linear equations and inequalities, matrices, linear programming, mathematics of finance, elementary probability and descriptive statistics.

Typically Offered: Fall, Spring, Summer.

Prerequisites: Grade of C or better in ASC 93 or 94; or math placement score (NDUS 413.1); or MATH 103, MATH 105, MATH 107, MATH 110, or MATH 210. Corequisite: ASC 98 if math placement score requires it or if grade in ASC 92 or ASC 94 is a C or better.



MATH 105. Trigonometry. 2 Credits.

The study of trigonometric functions and their properties. Topics include angle measure; trigonometric and inverse trigonometric functions; trigonometric identities and equations; parametric and polar coordinates; and general applications.

Typically Offered: On sufficient demand.

Prerequisites: Grade of C or better in ASC 93 or 94; or math placement score (NDUS 413.1); or MATH 103, MATH 104, MATH 107, MATH 110, or MATH 210. Corequisite: ASC 98 if math placement score requires it or if grade in ASC 92 or ASC 94 is a C or better.

MATH 107. Precalculus. 4 Credits.

The study of algebraic functions in preparation for calculus. Topics include equations and inequalities; polynomial, rational, exponential, logarithmic, trigonometric and inverse trigonometric functions; trigonometric identities and equations; and applications.

Typically Offered: Fall, Spring.

Prerequisites: Grade of C or better in ASC 93 or 94; or math placement score (NDUS 413.1); or MATH 103, MATH 104, MATH 105, MATH 110, or MATH 210. Corequisite: ASC 98 if math placement score requires it or if grade in ASC 92 or ASC 94 is a C or better.

MATH 110. Mathematics in Society. 3 Credits.

This course covers a broad range of mathematics that a person would encounter in their daily life. Topics include: statistical interpretation, data visualization, probability, growth models, finance, politics and voting, logic and sets, and the intersection of mathematics and the arts. Throughout, appropriate use of mathematical technology will be emphasized.

Typically Offered: Fall, Spring.

Prerequisites: Grade of C or better in ASC 93 or 94; or math placement score (NDUS 413.1); or MATH 103, MATH 104, MATH 105, MATH 107, or MATH 210. Corequisite: ASC 98 if math placement score requires it or if grade in ASC 92 or ASC 94 is a C or better.

MATH 146. Applied Calculus I. 3 Credits.

A study of limits, derivatives, integrals, exponential, logarithmic functions and applications.

Typically Offered: On sufficient demand.

Prerequisite: MATH 103; or MATH 107; or ACT Math score of 24 or higher; or qualifying math placement score.

MATH 165. Calculus I. 4 Credits.

The concepts, techniques, and applications of analytic geometry and differential and integral calculus. Topics include limits, continuity, differentiation, Mean Value Theorem, integration, Fundamental Theorem of Calculus, and applications.

Typically Offered: Spring.

Prerequisite: MATH 107; or MATH 103 and MATH 105; or ACT Math score of 24 or higher; or qualifying math placement score.

MATH 166. Calculus II. 4 Credits.

The concepts, techniques, and applications of analytic geometry and differential and integral calculus. Topics include applications and techniques of integration; polar equations; parametric equations; sequences and series; power series and applications.

Typically Offered: Fall.

Prerequisite: MATH 165.

MATH 199. Special Topics. 1-4 Credits.

Courses not offered in the regular catalog that provide an opportunity to extend student learning.

Typically Offered: On sufficient demand.

Repeatable: Up to 12 Credits.

MATH 208. Discrete Mathematics. 3 Credits.

Sets, relations and functions, combinatorics, logic, methods of proof, Boolean Algebra, difference equations, mathematical induction, combinatorics, introduction to graph theory and automata.

Typically Offered: Fall, odd years.

Prerequisites: MATH 103 or MATH 104 or MATH 107 or MATH 110 or MATH 165.

MATH 210. Elementary Statistics. 3 Credits.

An introduction to statistical methods of gathering, presenting and analyzing data. Topics include probability and probability distributions, confidence intervals, hypothesis testing, and linear regression and correlation.

Typically Offered: Fall, Spring, Summer.

Prerequisites: Grade of C or better in ASC 93 or 94; or math placement score (NDUS 413.1); or MATH 103, MATH 104, MATH 105, MATH 107, or MATH 110. Corequisite: ASC 98 if math placement score requires it or if grade in ASC 92 or ASC 94 is a C or better.

MATH 265. Calculus III. 4 Credits.

The concepts, techniques, and applications of analytic geometry and differential and integral calculus. Topics include multivariate and vector calculus including partial derivatives; multiple integration and its applications; line and surface integrals; Green's Theorem and Stoke's Theorem.

Typically Offered: Spring.

Prerequisite: MATH 166.



MATH 266. Introduction to Differential Equations. 3 Credits.

The study of differential equations. Topics include solutions of elementary differential equations by elementary techniques; Laplace transforms; systems of equations; matrix methods; numerical techniques; and applications.

Typically Offered: Fall.

Prerequisites: MATH 265 and MATH 330.

MATH 299. Special Topics. 1-4 Credits.

Courses not offered in the regular catalog that provide an opportunity to extend student learning.

Typically Offered: On sufficient demand.

Repeatable: Up to 12 Credits.

MATH 311. Modern Geometry. 3 Credits.

A study of axiomatic geometry including analysis and applications of the following topics: Congruence; Similarity, Right Triangles, and Trigonometry; Circles; Expressing Geometric Properties with Equations; Geometric Measurement and Dimension; Modeling with Geometry; Projective Geometry; Hyperbolic Plane Geometry; and Elliptic Plane Geometry.

Typically Offered: Spring, even years.

MATH 312. College Geometry II. 3 Credits.

A continuation of the advanced study of geometry. Topics include area theory, circles in a plane, constructions with ruler and compass, solid mensuration, and an introduction to non-Euclidean geometries.

Typically Offered: On sufficient demand.

MATH 313. Algebra and Functions for Teachers. 3 Credits.

A study of algebra and functions for pre-service teachers. Course includes analysis, applications, and pedagogical approaches for the following secondary school topics: seeing structure in expressions; arithmetic with polynomials and rational functions; creating and reasoning with equations and inequalities; interpreting and building linear, quadratic, exponential, and trigonometric functions.

Typically Offered: Spring, odd years.

MATH 314. Geometry & Trigonometry for Teachers. 3 Credits.

A study of axiomatic geometry and trigonometry for pre-service teachers. Course includes analysis, applications, and pedagogical approaches for the following secondary school topics: Congruence; Similarity, Right Triangles, and Trigonometry; Circles; Expressing Geometric Properties with Equations; Geometric Measurement and Dimension; Modeling with Geometry. Additional undergraduate axiomatic geometry topics include Projective Geometry, Hyperbolic Plane Geometry, and Elliptic Plane Geometry.

Typically Offered: Spring, even years.

MATH 321. Applied Probability and Statistics. 3 Credits.

A non-calculus-based introduction to methods of probability and statistics. Topics to be covered are combinatorial probability, random variables and their distributions, distribution functions and their properties, and the Central Limit Theorem and its applications. Sample-based inferences of population means and standard deviations, significance tests and confidence limits, tests of hypotheses, ANOVA, and regression analysis are covered.

Typically Offered: Spring.

Prerequisites: MATH 103 or MATH 104 or MATH 107 or MATH 110 or MATH 165 or MATH 210.

MATH 330. Linear Algebra and Matrices. 3 Credits.

An introduction to linear algebra which includes matrix algebra, linear systems, the notion of a vector space, and linear transformations and their matrix representations.

Typically Offered: Spring, even years.

MATH 340. Abstract Algebra. 4 Credits.

A study of algebraic structures. Topics include sets, mappings, relations, and operations; axiomatic development of familiar algebraic systems; examples and basic algebraic properties of groups, rings and fields.

Typically Offered: Fall, even years.

Prerequisite: MATH 165.

MATH 394. Independent Study. 1-3 Credits.

Directed reading, study, and/or activities in selected topics.

Typically Offered: On sufficient demand.

Repeatable: Up to 12 Credits.

MATH 399. Special Topics. 1-4 Credits.

Courses not offered in the regular catalog that provide an opportunity to extend student learning.

Typically Offered: On sufficient demand.

Repeatable: Up to 12 Credits.

MATH 400. History and Philosophy of Mathematics. 2 Credits.

An introduction to the history and philosophy of mathematics. Topics include ancient origins; foundations of logic; medieval and renaissance mathematics; intuitionism and formalism; mathematical technology; the axiom of choice; and modern advancements.

Typically Offered: Spring, odd years.

MATH 410. Real Analysis. 3 Credits.

An introduction to rigorous theory of calculus. Topics covered include the real number system, sequences, limits, continuous functions in \mathbb{R} , continuous functions of several variables, metric spaces uniform convergence, interchange of limit operations, infinite series, mean value theorems and their applications, and Riemann integrals.

Typically Offered: Fall.

Prerequisite: MATH 265.



MATH 490. Methods of Teaching Secondary Mathematics.

3 Credits.

An opportunity for students planning to teach math in the secondary schools to understand and apply content topics which align with ND Math Education standards and ND teacher education standards.

Typically Offered: Fall, even years.

MATH 491. Math Capstone. 1 Credit.

A capstone course designed for students to demonstrate competence in math program learning outcomes.

Typically Offered: Fall.

Grading: S/U only.

MATH 494. Undergraduate Research. 3-12 Credits.

The course is designed to integrate subject matter from major coursework and other disciplines into a project that leads to the creation of an original body of knowledge.

Typically Offered: On sufficient demand.

Repeatable: Up to 12 Credits.

MATH 497. Internship. 3-12 Credits.

An opportunity for students to apply classroom learning to an on-the-job work experience. Internship must be related to the student's major or minor course of study and may be in any geographic location. Credit is granted in the range of three to twelve hours per semester and may be repeated up to a maximum of 12 credit hours. Application and approval through Career Services.

Typically Offered: Fall, Spring, Summer.

Prerequisites: Junior Standing or Senior Standing and cum GPA of 2.50 or higher.

Grading: S/U only.

Repeatable: Up to 12 Credits.

MATH 499. Special Topics. 1-4 Credits.

Courses not offered in the regular catalog that provide an opportunity to extend student learning.

Typically Offered: On sufficient demand.

Repeatable: Up to 12 Credits.