

University of Northern Iowa
Department of Mathematics
Master of Arts in Mathematics

Program of Study:

The Department of Mathematics at the University of Northern Iowa offers graduate study leading to the Master of Arts in Mathematics.

The Master's program is flexible and is designed to offer students an opportunity to broaden their mathematical knowledge in preparing for positions in industry or for a Ph.D.-level program in mathematics. Master's students must complete a minimum of 30 hours of course work in various fields of mathematics, including a core of Analysis, Algebra and Geometry/Topology course. Students following the non-thesis plan are expected to complete a research/scholarly paper and pass a set of comprehensive exams. Students following the thesis plan are expected to complete a research thesis. The program normally takes two years to complete.

Application:

Application forms for admission and financial support, as well as additional information about the department and its programs, can be obtained from the address below. Applicants whose native language is not English must have a current TOEFL score of at least 500 for admission and a score of at least 500 to be eligible for an assistantship. All application materials for stipends or scholarships must be received by March 1. Awards for stipends or scholarships for the following academic year are made in early April.

Correspondence and Information:

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Research Facilities:

The Department of Mathematics is housed in Wright Hall, a building that features a comfortable working environment along with several computer labs. Students have access to computers that are equipped with such mathematical software as the computer algebra systems Maple and Mathematica, and the Statistics Software S-Plus.

The university library, conveniently located adjacent to the Mathematics building, has a collection of over 700,000 books and more than 3,000 current periodicals and newspaper subscriptions. The holdings of the UNI library, as well as other libraries in the state, are accessible via the computer network.

The University of Northern Iowa, as well as the entire state of Iowa, has access to a fiber-optics network to transmit coursework and to conduct conferences.

Financial Aid, Cost of Study, and Cost of Living:

For information on these areas, see the Graduate College website at: www.grad.uni.edu/information/.

Location:

The Cedar Falls/Waterloo metropolitan area has a population of about 150,000 and offers a wide variety of cultural, educational, and recreational opportunities. Cedar Falls is located 268 miles West of Chicago, 200 miles South of Minneapolis, and 108 miles Northeast of Des Moines. Cedar Falls is accessible from the South via Interstate 380.

The University and the Department:

The University of Northern Iowa was established in 1876 and was granted university status in 1967. It currently supports fifty-two master's degree programs and the Doctor of Education degree and the Doctor of Industrial Technology degree. The Department of Mathematics has been offering a master's degree for more than 30 years.

Mathematics Emphasis

The Mathematics emphasis is available on the **thesis** and **non-thesis** options. Coursework must be completed with a cumulative 3.00 grade average.

Required (21 hours)

Mathematics:

MATH 5630	Differential Geometry (800:155)
	OR
MATH 5615	Geometric Transformations (800:189)
MATH 6420	Mathematical Analysis I (800:201)
MATH 6460	Complex Analysis I (800:203)
MATH 6500	Abstract Algebra I (800:240)

Select at least Two of the following:

MATH 6421	Mathematical Analysis II (800:202)
MATH 6461	Complex Analysis II (800:204)
MATH 6501	Abstract Algebra II (800:241)

Research:

MATH 6299	Research (800:299)
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Thesis option (6 hours)

Non-thesis option (3 hours)

Electives

Mathematics:

Select **12 hours** from any of the courses listed above that were not used for the requirements there or from among the following:

ACT SCI 5739	Topics in Actuarial Science (800:158)
MATH 5421	Advanced Calculus II (800:141)
MATH 5425	Differential Equations (800:149)
MATH 5430	Partial Differential Equations (800:150)
MATH 5440	Numerical Analysis (800:176)
MATH 5460	Introduction to Complex Analysis (800:156)
MATH 5501	Modern Algebra II (800:162)
MATH 5530	Combinatorics (800:143)
MATH 5640	History of Mathematics: To the Calculus (800:180)
MATH 5641	Topology I (800:167)
MATH 5752	Introduction to Probability (800:152)
MATH 6510	Theory of Numbers (800:210)
MATH 6640	Topics in the History of Mathematics (800:246)
MATH 6650	Topics in Mathematical Logic and Set Theory (800:263)
MATH 6779	Topics in Probability and Statistics (800:273)
STAT 5775	Introduction to Mathematical Statistics (800:174)
STAT 5776	Regression Analysis (800:175)
STAT 5777	Statistical Quality Assurance Methods (800:157)
STAT 5779	Applied Multivariate Statistical Analysis (800:196)

Thesis Option: Students pursuing the thesis option will complete requirements indicated above and 6 hours must be taken under MATH 6299 (800:299) – Research. Students will complete and defend a master’s level thesis.

Total Hours Thesis option: 36

Non-thesis option: Students pursuing the non-thesis option will complete requirements indicated above and 3 hours must be taken under MATH 6299 (800:299) – Research. Students will complete a research/scholarly paper and pass three comprehensive examinations.

Total Hours Non-thesis option: 33

Description of 6xxx-level courses:

MATH 6420 (800:201) - Mathematical Analysis I - 3 hrs.

Set theory; the real number system; Lebesgue measure; Lebesgue integral. Prerequisite(s): MATH 4420/MATH 5420 (800:140)
Corequisite(s): MATH 4421/MATH 5421 (800:141) or consent of instructor. (Offered Odd Springs)

MATH 6421 (800:202) - Mathematical Analysis II - 3 hrs.

Differentiation and integration; classical Banach spaces; metric spaces; general measure and integration theory. Prerequisite(s): MATH 6420 (800:201). (Offered Spring)

MATH 6460 (800:203) - Complex Analysis I - 3 hrs.

Analyticity; differentiation and integration of functions of one complex variable; power series, Laurent series; calculus of residues. Prerequisite(s): MATH 4420/MATH 5420 (800:140); MATH 4460/MATH 5460 (800:156); or consent of instructor. (Offered Spring)

MATH 6461 (800:204) - Complex Analysis II - 3 hrs.

Analytic continuation; harmonic functions; entire functions; conformal mapping; selected applications. Prerequisite(s): MATH 6460 (800:203). (Variable)

MATH 6510 (800:210) - Theory of Numbers - 3 hrs.

Mathematical study of integers: induction, divisibility, prime numbers, congruences, quadratic reciprocity, multiplicative functions. (Variable)

MATH 6500 (800:240) - Abstract Algebra I - 3 hrs.

Groups: quotient groups, isomorphism theorems, products of groups, group actions, Sylow theorems, solvable and nilpotent groups. Rings and fields: quotient rings, rings of polynomials, integral domains, fields of fractions. Prerequisite(s): MATH 4500/MATH 5500 (800:160). Corequisite(s): MATH 4501/MATH 5501 (800:162) or consent of instructor. (Offered Fall)

MATH 6501 (800:241) - Abstract Algebra II - 3 hrs.

Rings: arithmetic properties, prime and maximal ideals, Noetherian rings. Modules and vector spaces: linear transformations, free modules, finitely generated modules over PIDs, canonical forms. Fields: field extensions, Galois theory, solvability by radicals. Prerequisite(s): MATH 6500 (800:240) (Offered Spring)

MATH 6640 (800:246) - Topics in the History of Mathematics - 3 hrs.

Topics from history of algebra, analysis, arithmetic, geometry, number theory, probability, and topology as they appear in the development of Mesopotamian, Greek, Islamic, Indian, Chinese, and Western civilizations. May be repeated on different topic with consent of instructor. Prerequisite(s): MATH 3640/MATH 5640 (800:180). (Variable)

MATH 6650 (800:263) - Topics in Mathematical Logic and Set Theory - 3 hrs.

Topics from the predicate calculus and first-order mathematical theories; the Gödel completeness and incompleteness theorems; algebraic and many-valued logic; Boolean algebras, lattices, representation theorems, and models in set theory and mathematical logic; independence of the axioms of set theory (including the axiom of choice and the continuum hypothesis). May be repeated on different topic with consent of instructor. (Variable)

MATH 6779 (800:273) - Topics in Probability and Statistics - 3 hrs.

Topics from correlation and regression analysis, analysis of variance and co-variance, non-parametric methods, order statistics. May be repeated on different topic with consent of instructor. (Same as STAT 6779) Prerequisite(s): consent of instructor. (Variable)

MATH 6299 (800:299) – Research