Mathematics, MS

Learning Outcomes

Students:

- have a broad foundational knowledge of mathematics, preparing them to teach a wide variety of mathematics courses at any four-year college or university in the United States, work in a wide variety of business, industry, and government positions, and hold leadership positions in these organizations;
- can identify and develop new lines of investigation that push forward frontiers of research;
- can bring together problem-solving tools to make new discoveries, including locating and understanding the most current research literature, and working with interdisciplinary collaborators; and
- can communicate mathematics via professional writings and presentations at a level appropriate to the audience, from the general public to technical experts.

Requirements

The Master of Science program in mathematics requires a minimum of 30 s.h. of graduate credit. Students earn the degree through courses and comprehensive examinations. There is no MS thesis. Requirements (courses and comprehensive examination areas) may be modified with the department's consent.

Four different programs (I, II, III, and IV) lead to the MS in mathematics.

Program I

Program I prepares students for further study of pure and applied mathematics and for employment in government and business. Students in Program I take several courses and pass two comprehensive examinations. They must earn a grade of B-minus or higher in six of the courses and maintain a grade-point average (GPA) of at least 2.75 in all mathematics courses taken for the degree.

Program I requires the following courses.

Course #	Title	Hours
MATH:5000 & MATH:5010	Abstract Algebra I-II	6
MATH:5200 & MATH:5210	Introduction to Analysis I-II	6
MATH:5400	Fundamental Groups and Covering Spaces	3
MATH:5410	Introduction to Smooth Manifolds	3
MATH:5600	Nonlinear Dynamics with Numerical Methods	3
MATH:5700	Introduction to Partial Differential Equations	3

The two comprehensive examinations are chosen from algebra, analysis, differential equations, and topology.

Program II

Program II is designed for secondary school teachers. Program II requirements are similar to those for Programs I and III, but Program II students complete two mathematics education courses and a minimum of 24 s.h. in Department of Mathematics courses. The following courses may be used to satisfy the program II mathematics course requirements.

Course #	Title	Hours
MATH:3600	Introduction to Ordinary Differential Equations	2-3

Mathematics courses (prefix MATH) numbered 4000 or above

Students are encouraged to consult with the mathematics education faculty when planning their course of study.

Program III

Program III focuses on applied mathematics. Students in Program III take several courses and pass two comprehensive examinations. Students must earn a grade of B-minus or higher in six of the courses and maintain a GPA of at least 2.75 in all mathematics courses taken for the degree.

Program III requires the following courses.

Course #	Title	Hours
All of these:		
MATH:5200 & MATH:5210	Introduction to Analysis I-II	6
MATH:5600	Nonlinear Dynamics with Numerical Methods	3
MATH:5700	Introduction to Partial Differential Equations	3
MATH:5800	Numerical Methods I	3
MATH:5810	Numerical Methods II	3
Two elective courses from these:		
MATH:4060	Discrete Mathematical Models	3
MATH:4700	Partial Differential Equations and Applications	3
MATH:4820	Optimization Techniques	3
MATH:5400	Fundamental Groups and Covering Spaces	3
MATH:5410	Introduction to Smooth Manifolds	3
MATH:5750	Mathematical Biology I	3
MATH:5760	Mathematical Biology II	3

The two comprehensive examinations are chosen from analysis, differential equations, numerical analysis, and topology.

Program IV

Program IV is designed for nondepartmental students working toward a PhD in areas of study that require mathematical knowledge. The program has no specific required courses.

Students in Program IV are considered to have passed the comprehensive examination for the master's degree in mathematics if they have maintained a GPA of at least 3.00 in all mathematics courses taken for the MS in mathematics and have successfully completed the PhD comprehensive examination in their area of study.

Students in Program IV are assigned a mathematics advisor, who works with them and their major advisor to plan an appropriate curriculum for the MS in mathematics. A suitable program of study should be approved by a mathematics advisor before the student takes the PhD comprehensive examination, and a member of the mathematics faculty

should serve on the PhD comprehensive examination committee.

Admission

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations on the Graduate College website. Applicants to the PhD program have preference for admission and funding.

Admission to Programs I, II, and III is competitive and based on a combination of undergraduate coursework and grades, letters of recommendation, and test scores. Numerical standards change every year or so; exceptions may be made to the following guidelines.

Applicants must have completed work in an undergraduate program equivalent to the major in mathematics offered by the University of Iowa Department of Mathematics with an undergraduate grade-point average of at least 3.20. Relevance and difficulty of courses are considered when evaluating grades; grades of C or lower in mathematics courses must be balanced by grades of A. Individuals whose preparation does not meet this requirement may be admitted conditionally and are asked to take specific courses that cover deficiencies.

All applicants must submit three letters of recommendation.

Applicants whose first language is not English must submit official test scores to verify English proficiency. Applicants can verify English proficiency by submitting official test scores from the Test of English as a Foreign Language (TOEFL). English proficiency demonstrated by a score of at least 100 (internet-based) on TOEFL is expected. The International English Language Testing System (IELTS) with an overall score of 7 with no subscore less than 6 or the Duolingo English Test (DET) with a score of 105 or above also are accepted.

Career Advancement

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.