

# 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 choose from two subprograms, program I and program II. Students must earn a Graduate College major program grade-point average of 2.75.

3 s.h. of MATH:7990 Reading Research and mathematics courses (prefix MATH) numbered 7000 and above may be counted toward the degree.

The Master of Science in mathematics requires the following coursework.

## Program I Requirements

Program I is intended for master's students who have been admitted by the Department of Mathematics. It also provides a path for PhD students in mathematics or applied mathematical and computational sciences to earn a master's degree during their course of study. Students complete 30 s.h. in mathematics courses (prefix MATH), including at least 18 s.h. in courses numbered 5000 and 12 s.h. in courses numbered 3000 and above. They must also pass two qualifying examinations. The qualifying examinations may be chosen from algebra, analysis, differential equations, topology, and numerical analysis.

### 5000-Level Courses

Students must complete at least 18 s.h. from the following courses.

Course #	Title	Hours
One of these sequences:		
MATH:5000 & MATH:5010	Abstract Algebra I-II	6
MATH:5200 & MATH:5210	Introduction to Analysis I-II	6
Four courses from these:		
MATH:5000 & MATH:5010	Abstract Algebra I-II (if not taken as a required sequence)	6

MATH:5200 & MATH:5210	Introduction to Analysis I-II (if not taken as a required sequence)	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
MATH:5750	Mathematical Biology I	3
MATH:5760	Mathematical Biology II	3
MATH:5800	Numerical Methods I	3
MATH:5810	Numerical Methods II	3
Mathematics courses (prefix MATH) numbered 6000 and above with departmental approval		

## Program II Requirements

Program II is intended for students pursuing graduate degrees in other departments and students on the undergraduate-to-graduate (U2G) pathway. Students are advised to meet with the director of graduate studies (DGS) at the beginning of the master's program to understand the expectations for fulfilling the program requirements.

Students complete 30 s.h. in mathematics courses (prefix MATH), including at least 18 s.h. in courses numbered 5000 and above and 12 s.h. in courses numbered 3000 and above.

### 5000-Level Courses

Course #	Title	Hours
18 s.h. from these:		
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
MATH:5750	Mathematical Biology I	3
MATH:5760	Mathematical Biology II	3
MATH:5800	Numerical Methods I	3
MATH:5810	Numerical Methods II	3

### Depth Requirement

The depth requirement may be fulfilled one of three ways:

- achieve a master's pass or above in two of the five mathematics qualifying exams (algebra, analysis, differential equations, topology, and numerical analysis);
- fulfill a qualifying exam or similar requirement from a different graduate program at the University of Iowa, subject to approval of the Department of Mathematics; or
- complete a final project supervised or co-supervised by a faculty member in the Department of Mathematics, subject to departmental approval. The acting director of graduate studies and at least two members of the

qualifying committee representing two different subject areas must agree that the final project constitutes master's level work. Students are required to submit a Project Plan Form by the first week of their final semester.

## 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 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.

## Career Advancement

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