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 5000–level courses 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 and Abstract Algebra II	6
MATH:5200 & MATH:5210	Introduction to Analysis I and Introduction to Analysis II	6
Four courses from these:		
MATH:5000 & MATH:5010	Abstract Algebra I and Abstract Algebra II (if not taken as a required sequence)	6
MATH:5200 & MATH:5210	Introduction to Analysis I and Introduction to Analysis 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 5000–level courses and 12 s.h. in courses numbered 3000 and above.

5000-Level Courses

Course #	Title	Hours
18 s.h. from these:		
MATH:5000	Abstract Algebra I	3
MATH:5010	Abstract Algebra II	3
MATH:5200	Introduction to Analysis I	3
MATH:5210	Introduction to Analysis II	3
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.

Graduate Education

Graduate education prepares students with advanced knowledge and skills in specialized fields. At the University of Iowa, the Graduate College advocates for student-centered graduate education and supports equitable application of rules and policies across graduate programs.

Academics

University of Iowa graduate credentials are regulated by policies and requirements found in the Graduate College Manual of Rules and Regulations. This includes minimum grade-point average (GPA) requirements for academic standing and degree conferral. The Graduate College sets the minimum requirement. Individual graduate programs may establish higher GPA requirements.

Admissions

Graduate student applicants must meet admission requirements for both the Graduate College and the program to which they have applied. University of Iowa graduate admission requirements are published by the Graduate College and on the Graduate Admissions website.

Financial Support

Graduate students might be eligible for financial support. Several contingencies apply, including degree program and award type, satisfactory progress toward degree, satisfactory completion of all duties related to an appointment, and availability of funding. Graduate students should inquire directly with their program for more information about funding availability. The Graduate Student Employment Standards govern the employment relationship between the University of Iowa and all graduate teaching and research assistants in all matters except wages, which are covered by an existing collective bargaining agreement or the conditions of an applicable federal grant.

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.

Academic Plans

Sample Plans of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

Mathematics, MS

- Program I Subprogram
- Program II Subprogram

Program I Subprogram

Course	Title	Hours
Academic Career		
Any Semester		
30 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. [a, b]		
Graduate College major program GPA of at least 2.75 is required. [c]		
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.		
	Hours	**0**
First Year		
Fall		
MATH:5000 or MATH:5200	Abstract Algebra I [d] or Introduction to Analysis I	3
MATH course (5000-level) [e]		3
MATH course (5000-level) [e]		3
	Hours	**9**
Spring		
MATH:5010 or MATH:5210	Abstract Algebra II [d] or Introduction to Analysis II	3
MATH course (5000-level) [e]		3
MATH course (5000-level) [e]		3
	Hours	**9**
Summer		
Prepare for qualifying examinations [f]		
	Hours	**0**
Second Year		
Fall		
Elective course (prefix MATH, numbered 3000 or above) [g]		3

Elective course (prefix MATH, numbered 3000 or above) [g]	3
Hours	**6**
Spring	
Elective course (prefix MATH, numbered 3000 or above) [g]	3
Elective course (prefix MATH, numbered 3000 or above) [g]	3
Degree Application: apply for degree in MyUI (Degrees/Graduation tile)	
Hours	**6**
Total Hours	**30**

a Students complete 30 s.h. in mathematics courses (prefix MATH), including at least 18 s.h. in courses in 5000-level courses 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.

b Students must complete specific requirements in the University of Iowa Graduate College after program admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.

c Graduate College major program GPA is comprised of only the UI courses which are used to satisfy degree requirements.

d Students must complete either MATH:5000 and MATH:5010, or MATH:5200 and MATH:5210.

e See the General Catalog for list of approved courses.

f Students can take MATH:5950 if this course is offered in first year summer.

g Work with academic advisor to determine appropriate coursework and sequence.

Program II Subprogram

Course	Title	Hours
Academic Career		
Any Semester		
30 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website. [a, b]		
Graduate College major program GPA of at least 2.75 is required. [c]		
Program II is intended for students pursuing graduate degrees in other departments. 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.		
Hours		**0**
First Year		
Fall		
MATH course (5000-level) [d]		3
MATH course (5000-level) [d]		3
MATH course (5000-level) [d]		3
Hours		**9**
Spring		
MATH course (5000-level) [d]		3
MATH course (5000-level) [d]		3
MATH course (5000-level) [d]		3
Hours		**9**
Summer		
Prepare for depth requirement [e]		
Hours		**0**
Second Year		
Fall		
Elective course (prefix MATH, numbered 3000 or above) [f]		3
Elective course (prefix MATH, numbered 3000 or above) [f]		3
Hours		**6**
Spring		
Elective course (prefix MATH, numbered 3000 or above) [f]		3
Elective course (prefix MATH, numbered 3000 or above) [f]		3
Degree Application: apply for degree in MyUI (Degrees/Graduation tile)		
Hours		**6**
Total Hours		**30**

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

b Students must complete specific requirements in the University of Iowa Graduate College after program admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.

c Graduate College major program GPA is comprised of only the UI courses which are used to satisfy degree requirements.

d See the General Catalog for list of approved courses.

e The depth requirement may be fulfilled one of three ways: 1) achieve a master's pass or above in two of the five mathematics qualifying exams (algebra, analysis, differential equations, topology, and numerical analysis); 2) 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 3) 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.

f Work with academic advisor to determine appropriate coursework and sequence.