MATHEMATICS (MS)

Department Website (http://math.nyu.edu)

NYSED: 08306 **HEGIS:** 1701.00 **CIP:** 27.0101

Program Description

The Department of Mathematics is part of the Courant Institute of Mathematical Sciences (https://cims.nyu.edu/), an independent division of New York University (https://www.nyu.edu/). Based in Warren Weaver Hall, at the heart of New York University's Washington Square campus, it is one of the top-ranked Mathematics departments worldwide (#4 in the US and #9 in the world as per the Shanghai rankings (https://www.shanghairanking.com/rankings/gras/2022/RS0101/); #6 in the US and #8 in the world as per the QS rankings (https://www.topuniversities.com/university-rankings/university-subject-rankings/2022/mathematics/)).

For more on the Courant Institute and its pioneering history in the field of applied mathematics (our department is consistently ranked #1 in applied mathematics as per USNews), see the history page (http://cims.nyu.edu/about/history.html).

The study of mathematics can lead to a variety of exciting professional careers. Basic research, engineering, finance, business, and government service are among the opportunities open to those with mathematical training. Moreover, with the increasing importance of basic science and information technology, prospects for careers in the mathematical sciences are very good. Mathematical analysis and computational modeling are important for solving some of the most pressing problems of our time - new energy resources, climate change, risk management, epidemiology, to name a few. We must strive to maintain our technological edge; mathematical skills will be crucial to this effort.

Some more specific business positions include portfolio analysis, design studies, statistical analysis, computer simulation, software design and testing, and other areas of operations research. There are extensive opportunities for mathematics in finance, the actuarial fields, and economic forecasting.

Many laboratories, both government and private, maintain independent research staffs that include mathematicians. Their work often deals with the development of new technology, including research in basic physics and software development, as well as applied mathematics. Numerical simulation, such as weather and climate forecasting, depends heavily on the use of supercomputers.

Practical considerations aside, there is the pleasure of learning, applying, and creating mathematics. Real world issues pose problems that can be studied by formulating and analyzing mathematical models. In some cases applications may lead to new mathematics, and a new branch of the science is born. In other cases abstract theory finds unexpected practical purpose. Working on research problems is exciting; solving difficult problems successfully is, for many, satisfaction enough.

Admissions

All applicants to the Graduate School of Arts and Science (GSAS) are required to submit the general application requirements (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc.html), which include:

- Academic Transcripts (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/academic-transcripts.html)

- Test Scores (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/test-scores.html) (if required)
- Applicant Statements (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/statements.html)
- Résumé or Curriculum Vitae
- Letters of Recommendation (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/letters-of-recommendation.html), and
- A non-refundable application fee (https://gsas.nyu.edu/admissions/arc.html#fee).

See Mathematics (https://gsas.nyu.edu/admissions/arc/programs/mathematics.html) for admission requirements and instructions specific to this program.

Program Requirements

The program requires either 36 credits of coursework and a grade of at least B on the written comprehensive examination, or 32 credits of coursework and a master's thesis completed under the supervision of a faculty member and approved by the department. Under both options, students may be able to transfer up to 8 credits (usually equivalent to two CIMS courses) from other academic institution.

Course	Title	Credits
Major Requirements		
Group I		
MATH-GA 1410	Intro to Math Analysis I	3
MATH-GA 2450	Complex Variables I	3
MATH-GA 2110	Linear Algebra I	3
Group II		
Select two courses from Group II		6
MATH-GA 1420	Intro to Math Analy II	
MATH-GA 2460	Complex Variables II	
MATH-GA 2120	Linear Algebra II	
MATH-GA 2901	Essentials of Probability	
MATH-GA 2043	Scientific Computing	
MATH-GA 2470	Ordinary Diff Equatns I	
Select three additional courses from Group II or Group III		9
Group III		
MATH-GA 1002	Multivariable Analysis	
MATH-GA 2010	Numerical Methods I	
MATH-GA 2020	Numerical Methods II	
MATH-GA 2130	Algebra I	
MATH-GA 2210	Introduction to Number Theory I	
MATH-GA 2310	Topology I	

MATH-GA 2350	Differential Geometry I	
MATH-GA 2490	Introduction to Partial Differential Equations	
MATH-GA 2550	Functional Analysis I	
MATH-GA 2563	Harmonic Analysis	
MATH-GA 2701	Methods of Applied Mathematics	
MATH-GA 2702	Fluid Dynamics	
MATH-GA 2902	Stochastic Calculus	
MATH-GA 2911	Probability Theory I	
MATH-GA 2962	Mathematical Statistics	
Electives		
Other Elective Credits		8-12
Total Credits		**36**

Additional Program Requirements

Written Comprehensive Examination

Master's students who choose the Written Comprehensive Examinations option must pass with an overall grade of B. The three-part Written Comprehensive Examination is administered by the department twice a year in early September and early January. Most Master's students tend to take the exam toward the end of their graduate studies.

Master's Thesis

Students who have earned a GPA of 3.7 or higher and taken at least 18 credits in the program have the option to write a Master's thesis under the supervision of a Mathematics faculty member. In certain cases involving interdisciplinary research, a second advisor outside the Department of Mathematics may be approved by the Director of Graduate Studies. All students must submit the Thesis Proposal and Advisor Approval form, (https://math.nyu.edu/media/math/filer_public/e0/63/e06307be-9baf-4689-8b48-fcf757152a8a/thesis_proposal_and_advisor_form.pdf)outlining the research plan for the thesis which has been approved by the thesis advisor, to the Program Administrator at least four months prior to the graduation date. The completed Master's thesis must be approved by two readers -- the thesis advisor and a second reader. At least one of the readers must be a full-time Courant Mathematics faculty member. You can find more detailed information in the Thesis Guidelines FAQ. (https://math.nyu.edu/media/math/filer_public/5f/88/5f885a98-00b6-4727-a2c2-c30bfd093673/thesis_guidelines.pdf)

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
MATH-GA 1410	Intro to Math Analysis I	3
MATH-GA 2450	Complex Variables I	3
MATH-GA 2110	Linear Algebra I	3
	Credits	**9**
2nd Semester/Term		
Group II Course		3
Group II Course		3
Group II or III Course		3
	Credits	**9**
3rd Semester/Term		
Group II or III Course		3
Group II or III Course		3
Elective		3
	Credits	**9**
4th Semester/Term		
Elective		3
Elective		3
Elective		3
	Credits	**9**
	Total Credits	**36**

Learning Outcomes

The master's degree in mathematics encompasses the basic graduate curriculum in mathematics, and offers the opportunity of some more specialized training in an area of interest. A typical master's student will have a basic knowledge in analysis, linear algebra, complex variables, basic probability, and possibly in ordinary and partial differential equations and numerical methods.

Additionally, graduates will have:

1. Basic knowledge in analysis, linear algebra and complex variables.
2. Knowledge in more specialized subjects such as probability, ordinary and partial differential equations, algebra, applied mathematics, and financial mathematics.
3. Development of some familiarity with research problems in mathematics.

Policies

NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

Graduate School of Arts and Science Policies

Academic Policies for the Graduate School of Arts and Science can be found on the Academic Policies page (https://bulletins.nyu.edu/graduate/arts-science/academic-policies/).