Department of Mathematics

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The Department of Mathematics offers two graduate degree programs, a combined undergraduate and graduate program, and one advanced certificate program:

- M.S. in Applied Mathematics-Data Analytics
- M.S. in Mathematics
- 5 year B.A.-M.S. or B.S.-M.S. in Applied Mathematics-Data Analytics
- Advanced Certificate in Applied Mathematics-Data Analytics.

The degree requirements, as well as the admission requirements, for each degree, are listed below.

M.S. in Applied Mathematics-Data Analytics

Program Overview

The program is designed for students with a strong background in mathematics and a major in a quantitative field who wish to prepare for careers in industry, business, government, or for further study at the doctoral level. It is a particularly good fit for students who want to transition into data analytics and data science careers. The curriculum emphasizes the application of mathematics and programming with open-ended course projects. The courses combine theory and application striving to give students practical tools which they will use in their future careers.

Students will typically complete the program in 3 semesters plus an internship or a research project during a summer. Students may pursue the program full-time or part-time. Courses are scheduled in the evenings to accommodate students who work full-time. The program gives flexibility by allowing students to start in either the fall or the spring semester.

Students entering the job market upon graduation will receive support in the internship and job application process. Students interested in pursuing a Ph.D. will receive advisement in the graduate application process.

Financial Support

The total cost for a master's degree is competitive for graduate programs in New York City. Financial support for graduate students in the M.S. in Applied Mathematics-Data Analytics is available on a competitive basis in the form of graduate assistantships.

Admission Requirements

Applicants should possess a degree in a STEM or quantitative discipline, some exposure to computer programming, and have the desire to learn mathematical and computational methods which they will apply to real-world problems. The prerequisites for the program

are multivariable calculus, probability or calculus-based statistics, linear algebra, and a programming class.

Degree Requirements

The 30-credit hour program consists of a core of study in computational methods, probability, statistics, machine learning, databases, linear algebra, and operations research, complemented by electives.

Manhattan College undergraduate students from any major can count up to six graduate credits toward both their undergraduate degree and their graduate degree in mathematics which may allow them to complete the master's program in one additional year.

There are four master's comprehensive exams. These are the final exams (or term projects) in MATG 511, 571, 630, and 635. Three of these must be passed with a B or better in order to complete the program.

The required classes are listed below. In addition, students choose 2 electives subject to approval by the Graduate Director. These electives are chosen in accordance with the student’s personal interests, either in mathematics, computer science, engineering, or business administration, or they may elect to pursue an internship or research project.

Required Courses for the M.S. in Applied Mathematics-Data Analytics:

MATG 511	Computational Methods for Analytics	3
MATG 555	Operations Research	3
MATG 557	Machine Learning	3
MATG 571	Advanced Linear Algebra with Applications	3
MATG 630	Probability and Statistics for Analytics	3
MATG 633	Advanced Statistical Inference	3
MATG 635	Probabilistic Methods	3
MATG 659	Database Methods for Analytics	3
Plus two graduate electives in Mathematics, Business, Computer Science or Engineering.		6
Total Credits		**30**

B.A. or B.S. Mathematics, M.S. Applied Mathematics-Data Analytics

The program is a seamless 5 year B.S.-M.S. or B.A.-M.S. program with a Bachelors in Mathematics and an M.S. in Applied Mathematics-Data Analytics.

This program is designed for students with a strong background in mathematics who wish to prepare for careers in business, industry, or government, or for further study at the doctoral level. In addition to the core undergraduate courses in the discipline, at the graduate level students will master probabilistic and statistical methods, machine learning, and optimization. Students also have the opportunity to complete minors in cognate disciplines.

Students will typically complete all requirements for the B.A. or B.S. in 4 years. They will apply to the M.S. program during their junior or senior year. If accepted, they take graduate classes during their 3rd and 4th years of study and will complete the requirements for the M.S. degree in a fifth year. Manhattan College students can count up to six graduate credits toward both their undergraduate and graduate degrees. The admission requirements for this program are the same as those for the M.S. in Applied Mathematics-Data Analytics.

Advanced Certificate in Applied Mathematics-Data Analytics

To complete the Advanced Certificate in Applied Mathematics-Data Analytics, a student must complete 18 credits, to be chosen in consultation with the graduate director from the MATG courses eligible for credit towards the M.S. in Applied Mathematics-Data Analytics. An advanced certificate provides graduate training to students and evidence of graduate performance to employers. Students in the Advanced Certificate program are also eligible for graduate assistantships and research assistantships. The admission requirements for this program are the same as those for the M.S. in Applied Mathematics-Data Analytics.

M.S. in Mathematics

Program Overview

This program is for individuals who intend to pursue the Ph.D. in Mathematics or a related discipline, or who wish to teach mathematics in a community college. Students in the program will complete course work in foundational areas of pure mathematics: linear and abstract algebra, real and complex analysis, topology, and probability-statistics. Electives may be chosen to deepen the applicant’s knowledge in preparation for study at the Ph.D. level, for breadth including applications, and may include research. A thesis option is available for those who wish to do research.

This program may be completed on either a full-time or a part-time basis. Qualified Manhattan College undergraduates may begin graduate classes in their junior or senior year, thereby enabling completion of the M.S. degree in a single postgraduate year plus two summers. The program gives flexibility by allowing students to start in either the fall or the spring semester.

Financial Support

The total cost for a master's degree is competitive for graduate programs in New York City. Financial support for graduate students in the M.S. in Mathematics is available on a competitive basis in the form of graduate assistantships.

Admission Requirements

Entering students should have seen, at a minimum, calculus I-II-III, a proof-theoretic linear algebra, and a probability or statistics class. Courses in abstract algebra and real analysis are required, but may be taken at the graduate level if necessary. A major in mathematics is desirable. A course in programming is recommended.

Degree Requirements

The program requires 30 credits of graduate mathematics including 15 credits in core classes that include advanced linear algebra, principles of mathematical analysis and 9 credits chosen from topology, probability, abstract algebra, and complex analysis. Fifteen additional elective credits round out the program. For students entering without abstract algebra and real analysis, the program can be extended up to 36 credits. Students have the option of completing a thesis.

Manhattan College undergraduate students from any major can count up to six graduate credits toward both their undergraduate degree and graduate degree in mathematics which may allow them to complete the master's program in one additional year.

The student must pass master's comprehensive exams with a B or better in MATG 571, MATG 588, and one of the courses chosen from MATG 564, 630, 678, or 690. Final exams in these courses will serve as the comprehensive exams.

Required Courses for the M.S. in Mathematics:

6 Prerequisite Credits (typically waived for students with appropriate background):		6
MATG 577	Foundations of Abstract Algebra	
MATG 587	Foundations of Mathematical Analysis	
15 Required Credits:		**15**
MATG 571	Advanced Linear Algebra with Applications	
and		
MATG 588	Principles of Mathematical Analysis	
Plus 9 Credits Chosen From:		
MATG 564	Topology	
MATG 630	Probability and Statistics for Analytics	
MATG 678	Abstract Algebra	
MATG 690	Graduate Complex Analysis	
15 Credits of Electives Chosen From:		**15**
MATG 511	Computational Methods for Analytics	
MATG 542	Number Theory	
MATG 548	Combinatorics and Graph Theory	
MATG 555	Operations Research	
MATG 556	Non-Linear Optimization	
MATG 557	Machine Learning	
MATG 633	Advanced Statistical Inference	
MATG 635	Probabilistic Methods	
MATG 691	Topics in Applied Mathematics	
MATG 692	Topics in Mathematics	
MATG 699	Research in Mathematics	
MATG 700	Thesis	

The remaining course from MATG 564, MATG 630, MATG 678 or MATG 690	
Total Number of Credits: 30 - 36	

Application Materials Required By All Graduate Programs

Application for admission to all graduate programs in the Mathematics Department is through the Office of Graduate Admissions. An on-line application can be accessed via the Office of Graduate Admissions web page.

To apply for any graduate program in the Department of Mathematics an applicant must submit the following:

- An academic transcript from all universities attended
- Two letters of recommendation (at least one of the letters of reference should be from a mathematics professor)
- A personal statement describing the applicant's background and interest in our graduate program
- Optional application materials include a resume and GRE scores.

Additional requirements for international applicants:

- All international applicants who were educated outside of the United States for their undergraduate and/or graduate degree must provide a course-by-course evaluation report (which should include your official transcripts) provided by one of the agencies listed on the NACES website (https://www.naces.org/members/).
- International students whose native language is not English need to submit scores from a language proficiency exam (TOEFL, TOEIC, ELTS or Duolingo). A minimum score of 550 in the paper-based TOEFL, 213 in the computer-based TOEFL, 80 Internet-Based TOEFL, 690 in the TOEIC, 6.5 in the IETLS, or 110 in Duolingo is required.

  International applicants can be exempt from the language proficiency exam if they meet one of the following criteria:

  - The applicant attended one academic year of study at a university or college in a country where English is the first official language.
  - The applicant is currently enrolled at a U.S. institution and has completed a 100-level (or equivalent) English Composition course and at least 12 credit hours of 100-level (or equivalent) courses.
  - The applicant was educated in one of these countries (https://manhattan.edu/admissions/graduate/english-proficiency-countries.php).