MATHEMATICS, MS

The MS program in Mathematics is designed to train students in mathematics that can be readily applied to practical, real-world problems, including those in data science, probability, statistics, and computer science, and to allow students to pursue mathematics as an intellectual discipline. Students who are interested in Actuarial Science are encouraged to apply for the MS program in Actuarial Science (https://catalog.roosevelt.edu/graduate/health-science/actuarial-sciences-ms/). The Mathematics program accepts properly prepared students who wish to attend on either a part- or full-time basis. Course offerings are primarily concentrated in the evenings to accommodate students who are employed during the day.

Admission

Applicants for admission to graduate work in Mathematics must meet the general requirements for admission to graduate work in the university. Students must have completed an undergraduate degree, not necessarily in mathematics, but must have completed linear algebra (equivalent to MATH 246 LINEAR ALGEBRA at Roosevelt) and at least three semesters of calculus (equivalent to MATH 231 CALCULUS I, MATH 232 CALCULUS II and MATH 233 CALCULUS III at Roosevelt) with grades of C- or higher and with a B (3.0) average. Students who wish to join the MS program but who are lacking some of these courses are encouraged to complete them prior to application, either at Roosevelt or elsewhere.

Each concentration in the MS has its own set of additional prerequisite courses. Students may enroll in prerequisite courses and certain graduate courses concurrently, provided the prerequisites for those graduate courses have been satisfied.

Prerequisites

Graduate students must satisfactorily complete the prerequisite courses listed below with grades of C- or higher and with a B (3.0) average, as well as any courses required of international students by the English Language Program. It is possible to make up any deficiencies after being admitted as a graduate student, but no credit will be granted towards the degree for meeting these requirements. Students may enroll in prerequisite courses and certain graduate courses concurrently, provided the prerequisites for those graduate courses have been satisfied. Program prerequisites must be completed within the first year (18 credits) of coursework unless alternate permission is given by the department chair or graduate advisor. Any of these prerequisites may be waived by a placement exam. The prerequisite courses are:

Code	Title	Credit Hours
MATH 245	DISCRETE STRUCTURES	
or MATH 290	INTRODUCTION TO PROOF	
MATH 347	PROBABILITY THEORY	
or MATH 352	ANALYSIS	
Additional Prerequisite for the Computer Science Concentration		
CST 150	COMPUTER SCIENCE I Or other programming course	
Additional Prerequisite for the Statistics Concentration		
MATH 217	ELEMENTARY STATISTICS Or other statistics course	

For descriptions of these prerequisites please see the course listings in the Undergraduate Catalog.

Advising

Following acceptance to the program, students meet with the graduate advisor to plan a program of study. Students must select one of the concentrations (computer science or statistics) for their program of study. All students are required to obtain approval for their course selections each semester. All courses presented for the degree must be approved by the graduate advisor. Up to 9 credit hours of transfer credit may be considered for the program; however, all such credit must be at the graduate level and may not be applied to any other earned degree.

- Students completing the MS in mathematics must choose a concentration in either computer science or statistics.
- All students must comply with grade requirements in the standard university policy for graduate degrees (https://catalog.roosevelt.edu/graduate/policies/academic-standing/), have a maximum of two grades at the C+ or C level, and have an overall GPA of at least 3.0.
- Students may transfer in up to three 3 credit graduate courses when admitted; these must comply with standard university policy for graduate transfer coursework (https://catalog.roosevelt.edu/graduate/admission/).

Computer Science Concentration

As computer technology evolves, so do the mathematical applications including probability and statistics, numerical analysis, data analytics, cryptography, neural networks, genetic algorithms, bioinformatics, and other fields of scientific computing. Students interested in working with computers while pursuing their MS in mathematics have the option of combining at least 18 credit hours of mathematics course work with up to 15 credit hours in computer science for a total of 33 credit hours.

Requirements

The completed degree requires a total of 33 credit hours of graduate course work.

Code	Title	Credit Hours
Core [2]		**6**
MATH 409	DATA MINING	
MATH 430	NUMERICAL ANALYSIS [1]	
Electives		**27**
Select four to seven courses from among the following options: [2]		
MATH 416	HISTORY OF MATHEMATICS	
MATH 418	NUMBER THEORY	
MATH 420	INTRODUCTION TO ABSTRACT ALGEBRA	
MATH 423	GAME THEORY AND APPLICATIONS	
MATH 428	LINEAR PROGRAMMING & OPTIM	
MATH 432	OPERATIONS RESEARCH [1]	
MATH 445	COMBINATORICS	
MATH 446	STOCHASTIC PROCESSES [1]	
MATH 447	ADVANCED PROBABILITY [1]	
MATH 448	PROBABILITY AND STATISTICS II	
MATH 449	REGRESSION & TIME SERIES [1]	
MATH 457	ANOVA & EXPERIMENTAL DESIGN [1]	

MATH 466	CRYPTOGRAPHY	
MATH 467	FINANCIAL MATHEMATICS	
MATH 475	DERIVATIVES MARKETS	
MATH 478	TOPICS IN ACTUARIAL MATH [1]	
MATH 489	SPECIAL TOPICS	
MATH 491	INDUSTRIAL APP OF MATH	
Select the remaining courses (for an overall total of eleven courses) from among the following: [2]		
CST 405	ALGORITHM DESIGN	
CST 406	BIG DATA	
CST 408	ADVANCED ALGORITHMS	
CST 410	NETWORK SCIENCE	
CST 411	INTELLIGENCE SYSTEMS	
CST 436	COMPUTING WITH DATA IN PYTHON	
CST 461	DEEP LEARNING	
CST 466	CRYPTOGRAPHY	
CST 468	INTERNET SECURITY	
CST 471	DISTRIBUTED DATABASES	
CST 480	SPECIAL TOPICS	
CST 482		
CST 486	INFORMATION RETRIEVAL [1]	
CST 487	SPECIAL TOPICS	
Total Credit Hours		**33**

[1] At least six courses must be listed exclusively at the graduate level.
[2] Substitutions may be made with advisor approval.

Statistics Concentration

The concentration in statistics prepares graduates for diverse and vital areas that may include medical research, drug testing, environmental risk assessment, quality assurance, economic forecasting, and the exploration of space. Students interested in applying statistics to other fields while pursuing their MS in mathematics have the option of combining at least 24 credit hours of mathematics course work with up to 9 credit hours in a cognate field (such as biology, chemistry, computer science, economics, education, finance, psychology, or sociology) for a total of 33 credit hours. If any of the core courses were taken as an undergraduate, substitutions may be made from the math electives with the approval of the graduate advisor.

Requirements

The completed degree requires a total of 33 hours of graduate course work.

Code	Title	Credit Hours
Core [2]		
MATH 430	NUMERICAL ANALYSIS [1]	3
MATH 446	STOCHASTIC PROCESSES [1]	3
MATH 447	ADVANCED PROBABILITY [1]	3
MATH 448	PROBABILITY AND STATISTICS II	3
MATH 449	REGRESSION & TIME SERIES [1]	3
MATH 457	ANOVA & EXPERIMENTAL DESIGN [1]	3
Electives		
Select two of the following: [2]		6
MATH 409	DATA MINING	
MATH 418	NUMBER THEORY	
MATH 420	INTRODUCTION TO ABSTRACT ALGEBRA	
MATH 423	GAME THEORY AND APPLICATIONS	
MATH 428	LINEAR PROGRAMMING & OPTIM	
MATH 432	OPERATIONS RESEARCH [1]	
MATH 445	COMBINATORICS	
MATH 467	FINANCIAL MATHEMATICS	
MATH 469	ACTUARIAL MATHEMATICS I	
MATH 470	ACTUARIAL MATHEMATICS II	
MATH 475	DERIVATIVES MARKETS [1]	
MATH 476	LOSS MODELS [1]	
MATH 478	TOPICS IN ACTUARIAL MATH	
MATH 489	SPECIAL TOPICS	
MATH 491	INDUSTRIAL APP OF MATH	
Three electives from mathematics or approved cognate fields		9
Total Credit Hours		**33**

[1] At least six courses must be listed exclusively at the graduate level.
[2] Substitutions may be made with advisor approval.

Your degree map is a general guide suggesting courses to complete each term on the academic pathway to your degree. It is based on the most current scheduling information from your academic program. Your program's degree map is reviewed annually and updated as schedules change (although you retain the same course requirements as long as you are continuously enrolled in your degree program).

Always work closely with your academic advisor to understand curriculum requirements and scheduling, as each student's academic plan can look slightly different. No more than two grades of C (not C-) may be applied toward the 33 hours used for the degree. A graduate course can only be repeated once; no more than two courses can be repeated.

Year 1

Fall	Credit Hours	Spring	Credit Hours
MATH 409	3	MATH 4XX	3
MATH 430	3	MATH 4XX	3
CST 4XX	3	CST 4XX	3
	9		**9**

Year 2

Fall	Credit Hours	Spring	Credit Hours
MATH 4XX or CST 4XX	3	MATH 4XX or CST 4XX	3
MATH 4XX or CST 4XX	3	MATH 4XX	3
MATH 4XX	3		
	9		**6**

Total Credit Hours 33

Your degree map is a general guide suggesting courses to complete each term on the academic pathway to your degree. It is based on the most current scheduling information from your academic program. Your program's degree map is reviewed annually and updated as schedules

change (although you retain the same course requirements as long as you are continuously enrolled in your degree program).

Always work closely with your academic advisor to understand curriculum requirements and scheduling, as each student's academic plan can look slightly different. No more than two grades of C (not C-) may be applied toward the 33 hours used for the degree. A graduate course can only be repeated once; no more than two courses can be repeated.

Year 1			
Fall	**Credit Hours**	**Spring**	**Credit Hours**
MATH 446	3	MATH 448	3
MATH 430	3	MATH 4XX	3
MATH 4XX	3	MATH 4XX or Cognate Area	3
	9		**9**
Year 2			
Fall	**Credit Hours**	**Spring**	**Credit Hours**
MATH 447	3	MATH 457	3
MATH 449	3	MATH 4XX or Cognate Area	3
MATH 4XX or Cognate Area	3		
	9		**6**

Total Credit Hours 33