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 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 consider the MS program in Actuarial Science (http://catalog.roosevelt.edu/graduate/arts-sciences/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 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. Any of these prerequisites may be waived by a placement exam. The prerequisites courses are:

- MATH 245 DISCRETE STRUCTURES
- MATH 290 INTRODUCTION TO PROOF
- MATH 347 PROBABILITY THEORY
- MATH 352 ANALYSIS

Prerequisite for the Computer Science Concentration

- CST 150 COMPUTER SCIENCE I Or other programming course

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 three concentrations (actuarial science, 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.

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.

Core

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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 409</td>
<td>DATA MINING</td>
<td>3</td>
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<tr>
<td>MATH 430</td>
<td>NUMERICAL ANALYSIS</td>
<td>3</td>
</tr>
<tr>
<td>MATH 450</td>
<td>BOOLEAN ALG &amp; SWITCH THEORY</td>
<td>3</td>
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Electives

Select three to six courses from among the following options:

- MATH 416 HISTORY OF MATHEMATICS
- MATH 423 COOPERATION AND COMPETITION - GAME THEORY AND APPLICATIONS
- MATH 432 OPERATIONS RESEARCH
- MATH 435
- MATH 446 STOCHASTIC PROCESSES
- MATH 447 ADVANCED PROBABILITY
- MATH 448 PROBABILITY AND STATISTICS II
- MATH 449 REGRESSION & TIME SERIES
- MATH 457 ANOVA & EXPERIMENTAL DESIGN
- MATH 478 TOPICS IN ACTUARIAL MATH
- MATH 489 SPECIAL TOPICS

Select the remaining courses (for an overall total of eleven courses) from among the following:

- CST 406 BIG DATA
- CST 408 ADVANCED ALGORITHMS
- CST 410 FORMAL LANGUAGES AND AUTOMATA
- CST 412 SEMINAR IN THEORY OF COMPUTATION
- CST 415 PARALLEL SYS & HIGH PERFORMANCE COMPUTING
- CST 451 BIOINFORMATICS
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.

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Electives

Select two of the following:  

MATH 409 DATA MINING  
MATH 423 COOPERATION AND COMPETITION - GAME THEORY AND APPLICATIONS  
MATH 428 LINEAR PROGRAMMING & OPTIM  
MATH 432 OPERATIONS RESEARCH  
MATH 435  
MATH 450 BOOLEAN ALG & SWITCH THEORY  
MATH 475 DERIVATIVES MARKETS  
MATH 476 LOSS MODELS  
MATH 478 TOPICS IN ACTUARIAL MATH  
MATH 489 SPECIAL TOPICS

Three electives from mathematics or approved cognate fields  

Total Credit Hours 33