MS in Mathematics

Admission Requirements
Transcripts of all undergraduate and any graduate work must be submitted. In addition to the Graduate College minimum requirements, applicants must meet the following program requirements:

- **Baccalaureate Field** Mathematics or a related field. Applicants must have 20 semester hours of undergraduate work in mathematics beyond calculus. Additional requirements vary by area as noted in each section.
- **Grade Point Average** At least 3.00/4.00 for the final 60 semester hours (90 quarter hours) of undergraduate study, and an average of 3.00 in all mathematics courses beyond calculus.
- **Tests Required** Neither the GRE General Exam nor the subject exams are required. Applicants may still submit GRE scores; however, an absence of GRE scores will not negatively impact their application.
- **Minimum English Competency Test Score**
  - TOEFL 100, with subscores of Reading 19, Listening 17, Speaking 20, and Writing 21 (iBT Test); 60, with subscores of Reading 19, Listening 17, Writing 21 (revised Paper-Delivered Test), OR,
  - IELTS 7.0, with subscores of 7.0 for all four subscores, OR,
  - PTE-Academic 54, with subscores of Reading 51, Listening 47, Speaking 53, and Writing 56.
- **Letters of Recommendation** Three required from persons familiar with the applicant’s academic work.
- **Personal Statement** Required.
- **Prerequisites**
  - **Concentration in Pure Mathematics:**
    - Linear Algebra (MATH 320 or equivalent)
    - Abstract Algebra (MATH 330 or equivalent)
    - One year of analysis (MATH 313 and one of MATH 410 or MATH 414, or equivalent)
  - **Concentration in Applied Mathematics:**
    - Differential Equations (MATH 220 or equivalent)
    - Linear Algebra (MATH 310 or MATH 320, or equivalent)
    - One year of analysis (MATH 313 and one of MATH 410 or MATH 414, or equivalent)
  - **Concentration in Mathematical Computer Science:**
    - Data Structures (MCS 360 or equivalent) or Symbolic Computation (MCS 320 or equivalent)
    - Discrete Mathematics (MCS 361 or equivalent)
    - Linear Algebra (MATH 310 or MATH 320, or equivalent)
    - Experience in programming and computing: the successful applicant will show proficiency in all requirements above, either through course work or relevant work experience.

Degree Requirements
In addition to the Graduate College minimum requirements, students must meet the following program requirements:

- **Minimum Semester Hours Required** 32.
- **Course Work** At least 24 hours must be in mathematics courses, of which 12 hours must be at the 500-level. The student must complete a course of study in one of the following concentrations or,

in exceptional cases approved by the Graduate Studies Committee, a general program of study without a concentration can be followed.

Concentration in Pure Mathematics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>MATH 414</td>
<td>Analysis II</td>
<td></td>
</tr>
<tr>
<td>or MATH 533</td>
<td>Real Analysis I</td>
<td></td>
</tr>
<tr>
<td>MATH 417</td>
<td>Complex Analysis with Applications</td>
<td></td>
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<tr>
<td>MATH 431</td>
<td>Abstract Algebra II</td>
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<tr>
<td>or MATH 516</td>
<td>Second Course in Abstract Algebra I</td>
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Select at least two additional courses from:

- MATH 430 Formal Logic I
- MATH 435 Foundations of Number Theory
- MATH 442 Differential Equations
- MATH 445 Introduction to Geometry of Curves and Surfaces
- MATH 517 Second Course in Abstract Algebra II
- MATH 533 Real Analysis I

Remaining courses to be selected in consultation with an advisor. Other courses may be substituted with the permission of the director of graduate studies.

Students must do one of the following: Pass a written comprehensive examination in pure mathematics or write a thesis and pass an oral defense.

Concentration in Applied Mathematics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>MATH 417</td>
<td>Complex Analysis with Applications</td>
<td></td>
</tr>
<tr>
<td>MCS 471</td>
<td>Numerical Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 481</td>
<td>Applied Partial Differential Equations</td>
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Select at least one course from:

- MATH 414 Analysis II
- MATH 480 Applied Differential Equations
- MATH 539 Functional Analysis I
- MATH 576 Classical Methods of Partial Differential Equations
- MATH 585 Ordinary Differential Equations
- MCS 571 Numerical Analysis of Partial Differential Equations

Remaining courses to be selected in consultation with an advisor. Other courses may be substituted with the permission of the director of graduate studies.

Students must do one of the following: Pass a written comprehensive examination in applied mathematics or write a thesis and pass an oral defense.

Concentration in Mathematical Computer Science

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<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>MCS 401</td>
<td>Computer Algorithms I</td>
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<tr>
<td>or MCS 441</td>
<td>Theory of Computation I</td>
<td></td>
</tr>
<tr>
<td>MCS 421</td>
<td>Combinatorics</td>
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Remaining courses to be selected in consultation with an advisor. Other courses may be substituted with the permission of the director of graduate studies.

Students must do one of the following: Pass a written comprehensive examination in mathematical computer science or write a thesis and pass an oral defense.
or MCS 423  Graph Theory
MCS 471  Numerical Analysis
  or MCS 481  Computational Geometry

Remaining courses to be selected in consultation with an advisor. Other courses may be substituted with permission of the director of graduate studies.

Students must do one of the following: Pass a written comprehensive examination in mathematical computer science or write a thesis and pass an oral defense.

Other Requirements
• Comprehensive Examination Optional. Students who do not pass a written comprehensive examination must complete a thesis.
• Thesis, Project, or Course-Work-Only Options Thesis or course work only (with written comprehensive examination). No other options are available.