APPLIED MATHEMATICS, MS

for the Master of Science in Applied Mathematics

The MS in Applied Mathematics program is intended for students wishing to pursue a career in applied mathematics. It is also suitable as preparation for a PhD program in Applied Mathematics. It is rare for students to enter the PhD program at the University of Illinois after finishing this degree. Students may choose one of three tracks: Optimization and Algorithms, Applications to the Sciences, or Computational Science and Engineering. This degree program requires 32 credit hours and can normally be completed in 18 months. A master's thesis is optional. Applications are accepted for Fall semester. Financial aid is generally not available.

for the Master of Science in Applied Mathematics

Students pursuing the M.S. in Applied Mathematics have the opportunity to customize the their studies the following ways:

- Through the Computational Science and Engineering Concentration.
- By completing the coursework for the option in Optimization and Algorithms;
- By completing the coursework for the option in Applications to the Sciences;
- By completing the coursework for the option in Computational Science and Engineering.

For additional details and requirements refer to the Department of Mathematics Graduate Guide (https://files.webservices.illinois.edu/7917/GraduateGuide18-19.pdf) and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook/).

Thesis Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coursework to total 32 hours in MATH or ASRM (in consultation with advisor).</td>
<td></td>
</tr>
<tr>
<td>MATH 599</td>
<td>Thesis Research</td>
<td>4</td>
</tr>
</tbody>
</table>

Choose one of these three (3) options:

Optimization and Algorithms Option

Courses from at least three (3) of the following areas:
- Optimization, Control Theory and Coding Theory, Combinatorics and Graph Theory, Algorithms and Theory of Computation, Statistics (including core courses listed below)

Select four (4) of the following:
- MATH 412 Graph Theory
- MATH 413 Intro to Combinatorics
- MATH/CS 450 Numerical Analysis
- MATH/CS 473 Algorithms
- ASRM 450/STAT 420 Methods of Applied Statistics
- MATH 482 Linear Programming
- MATH 484 Nonlinear Programming

Applications to the Sciences Option

Select three (3) of the following:
- MATH 418 Intro to Abstract Algebra II
- MATH 448 Complex Variables
- MATH 540 Real Analysis
- MATH 542 Complex Variables I

Total Hours 32

Other Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 405, MATH 406, MATH 415, MATH 444, and MATH 499</td>
<td>9-16</td>
<td></td>
</tr>
</tbody>
</table>

Minimum hours required within the unit: 20
Minimum 500-level hours required overall: 12 (8 in Mathematics)
Minimum GPA: 3.0
Total Hours (graduate study) 32

Non-Thesis Option

For all options:

Coursework to total 32 hours in MATH or ASRM (in consultation with advisor).

Choose one of these three (3) options:

Optimization and Algorithms Option

Courses from at least three (3) of the following areas:
- Optimization, Control Theory and Coding Theory, Combinatorics and Graph Theory, Algorithms and Theory of Computation, Statistics (including core courses listed below)

Select four (4) of the following:
- MATH 412 Graph Theory
- MATH 413 Intro to Combinatorics
- MATH/CS 450 Numerical Analysis
- MATH/CS 473 Algorithms
- ASRM 450/STAT 420 Methods of Applied Statistics
- MATH 482 Linear Programming
- MATH 484 Nonlinear Programming

Applications to the Sciences Option

Select three (3) of the following:
- MATH 489 Dynamics & Differential Eqns
- MATH 550 Dynamical Systems I

Total Hours 32

Information listed in this catalog is current as of 04/2024
Information listed in this catalog is current as of 04/2024

Computational Science and Engineering (CSE) Track
Applications to the Sciences Track
Optimization and Algorithms Track

Other Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 405, MATH 406, MATH 415, MATH 444, and MATH 499 cannot be counted toward this graduate degree.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minimum hours required within the unit: 20
Minimum 500-level hours required overall: 12 (8 in Mathematics)

Minimum GPA: 3.0
Total Hours (graduate study) 32

for the Master of Science in Applied Mathematics

Optimization and Algorithms Track

1. Students will gain a fundamental understanding of the theory of differential equations/dynamical systems.
2. Students will gain a fundamental understanding, at the graduate level, of at least one of the core subjects of abstract algebra, real analysis, complex analysis.
3. Students will gain an understanding of the use of computational techniques in the study of applied mathematics.
4. Students will gain experience in original research in applied mathematics, if desired. This goal applies to students on the thesis track of this program.

Graduate Degree Programs in Mathematics

- Actuarial Science, MS (http://catalog.illinois.edu/graduate/las/actuarial-science-ms/)
- Applied Mathematics, MS (p. 1)
- Mathematics, MS (http://catalog.illinois.edu/graduate/las/mathematics-ms/)
- Predictive Analytics and Risk Management, MS (http://catalog.illinois.edu/graduate/las/predictive-analytics-risk-management-ms/)
- Enterprise Risk Management (http://catalog.illinois.edu/graduate/las/predictive-analytics-risk-management-ms/enterprise-risk-management/)
- Financial and Insurance Analytics
- Mathematics, PhD (http://catalog.illinois.edu/graduate/las/mathematics-phd/)
- optional concentrations:
  - Actuarial Science & Risk Analytics (http://catalog.illinois.edu/graduate/las/mathematics-phd/actuarial-science-risk-analytics/)
  - Computational Science and Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/)
  - Teaching of Mathematics, MS (http://catalog.illinois.edu/graduate/las/teaching-mathematics-ms/)

for the Master of Science in Applied Mathematics

Mathematics Department
Department Chair: Vera Hur
Director of Graduate Studies: Yuliy Baryshnikov
Mathematics Department website (http://www.math.illinois.edu/)
Mathematics Department faculty (https://math.illinois.edu/directory/faculty-by-type/)
Mathematics faculty research (https://math.illinois.edu/research/faculty-research/)
273 Altgeld Hall, 1409 West Green Street, Urbana, IL 61801
(217) 333-5749
Mathematics email (math-grad@illinois.edu)

College of Liberal Arts & Sciences
College of Liberal Arts & Sciences website (https://las.illinois.edu/)

Admissions
Mathematics Admissions & Requirements (https://math.illinois.edu/admissions/graduate-program-mathematics-admissions/#MS-AppliedMath)
Graduate College Admissions & Requirements (https://grad.illinois.edu/admissions/apply/)