APPLIED MATHEMATICS, MS

for the Master of Science in Applied Mathematics

department chair: Vera Hur
director of graduate studies: Yuliy Baryshnikov
overview of admissions & requirements:
overview of grad college admissions & requirements: https://grad.illinois.edu/admissions/apply (https://grad.illinois.edu/admissions/apply/)
department website: http://www.math.illinois.edu
program website: https://math.illinois.edu/admissions/graduate-program-mathematics-admissions#MS-AppliedMath (https://math.illinois.edu/admissions/graduate-program-mathematics-admissions/#MS-AppliedMath)
department faculty: https://math.illinois.edu/research/faculty-research (https://math.illinois.edu/research/faculty-research/) and https://math.illinois.edu/directory/faculty (https://math.illinois.edu/directory/faculty/)
college website: https://las.illinois.edu/
department office: 273 Altgeld Hall, 1409 West Green Street, Urbana, IL 61801
phone: (217) 333-5749
eemail: math-grad@illinois.edu

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.

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 (http://catalog.illinois.edu/graduate/las/predictive-analytics-risk-management-ms/financial-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

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

• Through the Computational Science and Engineering Concentration (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/)
• 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>
</tbody>
</table>

Information listed in this catalog is current as of 04/2022
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:

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>MATH 412</td>
<td>Graph Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 413</td>
<td>Intro to Combinatorics</td>
<td></td>
</tr>
<tr>
<td>MATH/CS 450</td>
<td>Numerical Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH/CS 473</td>
<td>Algorithms</td>
<td></td>
</tr>
<tr>
<td>ASRM 450/STAT 420</td>
<td>Methods of Applied Statistics</td>
<td></td>
</tr>
<tr>
<td>MATH 482</td>
<td>Linear Programming</td>
<td></td>
</tr>
<tr>
<td>MATH 484</td>
<td>Nonlinear Programming</td>
<td></td>
</tr>
</tbody>
</table>

**Applications to the Sciences Option**

Select three (3) of the following:

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>MATH 489</td>
<td>Dynamics &amp; Differential Eqns</td>
<td></td>
</tr>
<tr>
<td>MATH 550</td>
<td>Dynamical Systems I</td>
<td></td>
</tr>
<tr>
<td>MATH 553</td>
<td>Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 558</td>
<td>Methods of Applied Mathematics</td>
<td></td>
</tr>
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</table>

Credit hours in a department other than Mathematics, providing substantive applications of differential equations and applied mathematics.

**Computational Science and Engineering Option**

MATH 550  | Dynamical Systems I                  | 4

or

MATH 553  | Partial Differential Equations       | 4

Choose one (1) advanced course in Algebra or Analysis:

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</thead>
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<tr>
<td>MATH 418</td>
<td>Intro to Abstract Algebra II</td>
<td></td>
</tr>
<tr>
<td>MATH 448</td>
<td>Complex Variables</td>
<td></td>
</tr>
<tr>
<td>MATH 540</td>
<td>Real Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 542</td>
<td>Complex Variables I</td>
<td></td>
</tr>
</tbody>
</table>

12 hours from CSE courses (at least 4 in MATH, 4 not in MATH)

**Total Hours**

32

**Other Requirements**

Code | Title | Hours
---|-------|-------
MATH 405, MATH 406, MATH 415, MATH 444, and MATH 499 cannot be counted toward this graduate degree.

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:

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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: 9-16
- MATH 489  Dynamics & Differential Eqns
- MATH 550  Dynamical Systems I
- MATH 553  Partial Differential Equations
- MATH 558  Methods of Applied Mathematics

Credit hours in a department other than Mathematics, providing substantive applications of differential equations and applied mathematics.  8

**Computational Science and Engineering Option**
- MATH 550  Dynamical Systems I  4
  or MATH 553  Partial Differential Equations

Choose one (1) advanced course in Algebra or Analysis:  3-4
- MATH 418  Intro to Abstract Algebra II
- MATH 448  Complex Variables
- MATH 540  Real Analysis
- MATH 542  Complex Variables I

12 hours from CSE courses (at least 4 in MATH, 4 not in MATH)  12

**Total Hours**  32

**Other Requirements**

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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