MATHEMATICS, PHD

for the Doctor of Philosophy in Mathematics

Graduate Degree Programs in Mathematics

Actuarial Science, MS (http://catalog.illinois.edu/graduate/las/actuarial-science-ms/)
Applied Mathematics, MS (http://catalog.illinois.edu/graduate/las/applied-mathematics-ms/)
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 (p. 1)
  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 Doctor of Philosophy in Mathematics

Students working toward a Ph.D. degree usually require from four to six years to complete the requirements. Each student must pass the comprehensive examinations (testing the student's knowledge of basic graduate-level mathematics in algebra, analysis, and other areas) and the preliminary examination (testing the student's ability to begin or continue research in a chosen field). Students must also write and defend a research thesis in their field of mathematics.

For additional details and requirements refer to the department's Guide to Graduate Studies (https://math.illinois.edu/academics/graduate-program-mathematics/) and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook/).

Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Students must demonstrate competence in five core courses including the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To demonstrate competence, a student must receive a B+ or higher in the course, or pass a written exam on the topic.</td>
<td></td>
</tr>
<tr>
<td>MATH 500</td>
<td>Abstract Algebra I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 540</td>
<td>Real Analysis</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Plus choose three of the following:</td>
<td>12</td>
</tr>
<tr>
<td>MATH 511</td>
<td>Intro to Algebraic Geometry</td>
<td></td>
</tr>
<tr>
<td>MATH 518</td>
<td>Differentiable Manifolds I</td>
<td></td>
</tr>
<tr>
<td>MATH 525</td>
<td>Algebraic Topology I</td>
<td></td>
</tr>
<tr>
<td>MATH 530</td>
<td>Algebraic Number Theory</td>
<td></td>
</tr>
<tr>
<td>MATH 531</td>
<td>Analytic Theory of Numbers I</td>
<td></td>
</tr>
<tr>
<td>MATH 542</td>
<td>Complex Variables I</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 561</td>
<td>Theory of Probability I</td>
<td></td>
</tr>
<tr>
<td>MATH 563</td>
<td>Risk Modeling and Analysis</td>
<td></td>
</tr>
<tr>
<td>MATH 570</td>
<td>Mathematical Logic</td>
<td></td>
</tr>
<tr>
<td>MATH 580</td>
<td>Combinatorial Mathematics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Master's equivalency</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>MATH 599</td>
<td>Thesis Research (0 min applied toward degree)</td>
</tr>
<tr>
<td></td>
<td>Total Hours:</td>
<td>96</td>
</tr>
</tbody>
</table>

Information listed in this catalog is current as of 11/2022
Other Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other requirements may overlap</td>
<td></td>
</tr>
<tr>
<td>MATH 405, MATH 406, MATH 415, MATH 444, and MATH 499 cannot be counted toward this graduate degree.</td>
<td></td>
</tr>
<tr>
<td>64 hours in residence</td>
<td></td>
</tr>
<tr>
<td>Masters Degree Required for Admission to PhD?</td>
<td>No</td>
</tr>
<tr>
<td>Comprehensive Exam Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Preliminary Exam Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Final Exam/Dissertation Defense Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Dissertation Deposit Required</td>
<td>Yes</td>
</tr>
<tr>
<td>Minimum GPA:</td>
<td>3.25</td>
</tr>
</tbody>
</table>

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1. Acquire a foundation in abstract algebra at the graduate level.
2. Acquire a foundation in real analysis at the graduate level.
3. Acquire a suitable breadth of knowledge to provide a foundation for undertaking high-level research.
4. Gain a broad understanding of the range of current research in the mathematical sciences.
5. Demonstrate depth of knowledge in chosen area of research specialization.
6. Gain the ability to conduct independent mathematical research at a professional level.
7. Gain experience and competence in the teaching of mathematics at the college level.

*for the Doctor of Philosophy in Mathematics*

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director of graduate studies: Yuliy Baryshnikov
overview of admissions & requirements: https://math.illinois.edu/admissions/graduate-program-mathematics-admissions/#Math-PhD
overview of grad college admissions & requirements: https://grad.illinois.edu/admissions/apply

department website: http://www.math.illinois.edu
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college website: https://las.illinois.edu/
department office: 273 Altgeld Hall, 1409 West Green Street, Urbana, IL 61801
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