MATHEMATICS: ACTUARIAL SCIENCE & RISK ANALYTICS, PHD

for the Doctor of Philosophy in Mathematics, Actuarial Science and Risk Analytics Concentration

The Concentration attracts students with strong interest in financial risk analytics and actuarial applications of mathematics, and equips them with advanced analytical tools for professional and academic careers. Students in the Concentration complete coursework or professional exams in Probability, Risk Modeling and Analysis, Mathematical Statistics, Theory of Finance, and Actuarial Models for Life Contingencies or Financial Economics.

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Students working toward a Ph.D. degree usually require four to six years to complete the requirements. Each student must pass the comprehensive examinations/courses 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/forms-guidebooks-handbooks-life-resources/) and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook/).

Requirements

Code	Title	Hours
Students must demonstrate competence in five core courses including the following:		
To demonstrate competence, a student must receive a B+ or higher in the course, or pass a written exam on the topic.		
MATH 540	Real Analysis	4
MATH 561	Theory of Probability I	4
MATH 563		4
STAT 511	Advanced Mathematical Statistics	4
Plus one of the following:		4
MATH 511	Intro to Algebraic Geometry	
MATH 518	Differentiable Manifolds I	
MATH 525	Algebraic Topology I	
MATH 530	Algebraic Number Theory	
MATH 531	Analytic Theory of Numbers I	
MATH 542	Complex Variables I	
MATH 550	Dynamical Systems I	
MATH 553	Partial Differential Equations	
MATH 570	Mathematical Logic	
MATH 580	Combinatorial Mathematics	
Students must demonstrate competence in the following:		
MATH 564	Applied Stochastic Processes	4
STAT 425	Statistical Modeling I	3 or 4
FIN 591	Theory of Finance	4
Students must demonstrate competence in two of the following:		**8**
ASRM 575	Life Insurance and Pension Mathematics	4
ASRM 510	Financial Mathematics	4
ASRM 561	Loss Data Analytics & Credibility	4
Master's equivalency		**32**
MATH 599	Thesis Research (0 min applied toward degree)	0
Total Hours required for the degree		**96**

Other requirements

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

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

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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/)
- Mathematics, PhD (http://catalog.illinois.edu/graduate/las/mathematics-phd/)
  - optional concentrations:
    - Actuarial Science & Risk Analytics (p. 1)
    - 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/)
  - optional concentration
    - Computational Science and Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/)

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Mathematics Department

Department Chair: Vera Hur
Director of Graduate Studies: Jared Bronski
Mathematics Department website (http://www.math.illinois.edu/)
Mathematics Department faculty (https://math.illinois.edu/directory/faculty/)
Actuarial Science faculty (https://asrm.illinois.edu/directory/faculty/)
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

Program website (https://asrm.illinois.edu/admissions/graduate-degrees/phd-mathematics-concentration-actuarial-science-and-risk-analytics/)
Mathematics Admissions & Requirements (https://math.illinois.edu/admissions/graduate-program-mathematics-admissions/#Math-PhD)
Graduate College Admissions & Requirements (https://grad.illinois.edu/admissions/apply/)