PREDICTIVE ANALYTICS AND RISK MANAGEMENT: FINANCIAL AND INSURANCE ANALYTICS, MS

for the Master of Science in Predictive Analytics and Risk Management, Financial and Insurance Analytics concentration

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-ActSci (https://math.illinois.edu/admissions/graduate-program-mathematics-admissions/#MS-ActSci)
department faculty: https://math.illinois.edu/research/faculty-research/actuarial-science (https://math.illinois.edu/research/faculty-research/actuarial-science/)
college website: https://las.illinois.edu/
department office: 273 Altgeld Hall, 1409 West Green Street, Urbana, IL 61801
phone: (217) 333-5749
email: math-grad@illinois.edu

Prepares students for the nascent profession of predictive analytics; it provides background and skill sets for data analytics with focus on financial and insurance industries. A student successfully finishing the program will typically have acquired a broad foundation of machine learning and predictive modeling techniques to forecast outcomes and glean valuable insights that can lead to better-informed business and investment decisions.

The assessment of the above-stated learning objectives will include:

- the job placement/graduate school acceptance rates
- feedback from employers
- graduate satisfaction surveys

These assessments will be conducted on an annual basis. We conduct exit surveys on all students each year, which should provide data on graduate students’ job placement and graduate school acceptance rates. On the survey we will design questions to assess student’s overall evaluation of these learning objectives. The curriculum was developed in close collaboration with industry partners. We expect to maintain close relationship with them and seek their feedback on the quality of our graduates on a regular basis.

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 (p. 1)
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/)

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Courses will be scheduled so that students may complete the 32-hour program in one academic year. Each concentration requires 12 hours of common core courses, organized around three broad areas of expertise, including a case study course. Each concentration also requires 12 hours of related area coursework specific to the concentration, plus an additional 8 hours of electives from a prescribed list included in this proposal. At least 12 hours must be taken at the 500 level.

Information listed in this catalog is current as of 06/2022
### Core Requirements (12 hours):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 530</td>
<td>Foundations in Risk Management</td>
<td>2</td>
</tr>
<tr>
<td>ASRM 410</td>
<td>Investments and Financial Markets</td>
<td>4</td>
</tr>
<tr>
<td>ASRM 539</td>
<td>Risk Analytics and Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>ASRM 555</td>
<td>Advanced Predictive Analytics</td>
<td>4</td>
</tr>
</tbody>
</table>

### Concentration Required Courses (see below) 12

### Electives (see below) 8

### Total Hours 32

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### Other Requirements

- Other requirements may overlap
- A concentration is required.
- Minimum 500-level Hours Required Overall: 12
- Minimum GPA: 2.75

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### Financial and Insurance Analytics Concentration

#### Required Courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 431</td>
<td>Applied Bayesian Analysis</td>
<td>12</td>
</tr>
<tr>
<td>STAT 432</td>
<td>Basics of Statistical Learning</td>
<td></td>
</tr>
<tr>
<td>STAT 480</td>
<td>Big Data Analytics</td>
<td></td>
</tr>
</tbody>
</table>

#### Electives: 8

Choose two of the following:

- ASRM 409 | Stochastic Processes for Finance and Insurance
- ASRM 499 | Topics in Actuarial Science
- ASRM 510 | Financial Mathematics
- ASRM 533 | Risk Management Practices and Regulation
- ASRM 539 | Risk Analytics and Decision Making (if not taken as a core requirement)
- ASRM 561 | Loss Data Analytics & Credibility
- ASRM 569 | Extreme Value Theory and Catastrophe Modeling
- ASRM 575 | Life Insurance and Pension Mathematics
- ASRM 595 | Advanced Topics in Actuarial Science and Risk Analytics
- FIN 431 | Property-Liability Insurance
- FIN 511 | Investments
- FIN 512 | Financial Derivatives
- FIN 513 | Applications of Financial Engineering
- FIN 514 | Valuation of Complex Derivative Securities
- FIN 515 | Fixed Income Portfolios
- FIN 519 | Behavioral Finance
- FIN 526 | Investment Banking
- FIN 537 | Financial Risk Management
- FIN 551 | International Finance
- FIN 580 | Special Topics in Finance (Big Data Analytics)
- FIN 590 | Individual Study and Research
- MATH 563 | Risk Modeling and Analysis
- STAT 542 | Statistical Learning
- STAT 590 | Individual Study and Research

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