Actuarial Science, M.S.

Learning Outcomes

Graduates will:

- be able to bring to bear actuarial, financial, mathematical, and statistical techniques to model and analyze risks, particularly in the context of insurance and pension;
- have the knowledge and analytical ability to pass the initial professional actuarial examinations given by the Society of Actuaries and Casualty Actuarial Society, and develop the skills needed for successful self-study of the advanced professional examinations;
- be skillful in using and developing computer software to solve actuarial problems;
- be able to clearly communicate results from an actuarial analysis to all stakeholders, and write effective reports that describe the analysis and summarize important findings; and
- possess a basic understanding of insurance and business operations.

Requirements

The Master of Science program in actuarial science requires 36 s.h. of graduate credit. The program prepares students for actuarial careers by emphasizing the theory that underlies risk processes and the application of this theory to practical problems of insurance pricing and management. It also helps them learn the material that is tested on professional examinations administered by professional organizations such as the Society of Actuaries and the Casualty Actuarial Society.

Students complete required courses and a final examination. The M.S. with a major in actuarial science requires the following coursework.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of these sequences:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT:4100-STAT:4101</td>
<td>Mathematical Statistics I-II (same as IGPI:4100-IGPI:4101)</td>
<td>6</td>
</tr>
<tr>
<td>STAT:5100-STAT:5101</td>
<td>Statistical Inference I-II (for well-prepared students)</td>
<td>6</td>
</tr>
<tr>
<td>All of these:</td>
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</tr>
<tr>
<td>ACTS:3080</td>
<td>Mathematics of Finance I</td>
<td>3</td>
</tr>
<tr>
<td>ACTS:4130</td>
<td>Quantitative Methods for Actuaries</td>
<td>3</td>
</tr>
<tr>
<td>ACTS:4150</td>
<td>Fundamentals of Short-Term Actuarial Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>ACTS:4180</td>
<td>Life Contingencies I</td>
<td>3</td>
</tr>
<tr>
<td>ACTS:4280</td>
<td>Life Contingencies II</td>
<td>3</td>
</tr>
<tr>
<td>ACTS:6200</td>
<td>Predictive Analytics</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4560</td>
<td>Statistics for Risk Modeling I</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4561</td>
<td>Statistics for Risk Modeling II</td>
<td>3</td>
</tr>
<tr>
<td>STAT:6300</td>
<td>Probability and Stochastic Processes I</td>
<td>3</td>
</tr>
<tr>
<td>A course approved by the advisor</td>
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Final Examination

The final examination is offered in the spring semester of the second year of study. Students who do not succeed on their first attempt may retake the exam once.

Admission

Applicants must meet the admission requirements of the Graduate College; see the Manual of Rules and Regulations on the Graduate College website.

Career Advancement

Most actuaries are employed by insurance companies or employee benefits consulting firms. They have responsibilities related to all phases of product development and maintenance for their companies. Individual employers who need guidance in establishing employee insurance and retirement programs also hire actuarial science graduates. A growing number of actuaries work in asset/liability management, some in investment firms, and others in insurance companies.

Actuaries have always been in high demand and earn good salaries. Most Iowans find work as actuaries, but some become financial managers and teachers. They take positions in locations all across the country, often in large metropolitan areas.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.

Academic Plans

Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

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<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Career</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any Semester</td>
<td></td>
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</tr>
<tr>
<td>36 s.h. must be graduate level coursework; graduate transfer credits allowed upon approval. More information is included in the General Catalog and on department website.</td>
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<tr>
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<tr>
<td>First Year</td>
<td>Fall</td>
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<tr>
<td>ACTS:3080</td>
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<td>ACTS:4130</td>
<td>Quantitative Methods for Actuaries</td>
<td>3</td>
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<tr>
<td>STAT:4100 or STAT:5100</td>
<td>Mathematical Statistics I or Statistical Inference I</td>
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<tr>
<td></td>
<td>Hours</td>
<td>9</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACTS:4150</td>
<td>Fundamentals of Short-Term Actuarial Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>ACTS:4180</td>
<td>Life Contingencies I</td>
<td>3</td>
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<tr>
<td>STAT:4101 or STAT:5101</td>
<td>Mathematical Statistics II or Statistical Inference II</td>
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</tr>
<tr>
<td></td>
<td>Hours</td>
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Second Year

Fall

<table>
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<th>Course</th>
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<th>Hours</th>
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<tbody>
<tr>
<td>ACTS:4280</td>
<td>Life Contingencies II</td>
<td>3</td>
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<td>STAT:4560</td>
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<tr>
<td></td>
<td><strong>Hours</strong></td>
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Spring

<table>
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<tr>
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<tr>
<td>ACTS:6200</td>
<td>Predictive Analytics</td>
<td>3</td>
</tr>
<tr>
<td>STAT:4561</td>
<td>Statistics for Risk Modeling II</td>
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<tr>
<td>Elective course</td>
<td>e</td>
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</tr>
<tr>
<td></td>
<td><strong>Hours</strong></td>
<td><strong>9</strong></td>
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</table>

|          | **Total Hours**                     | **36** |

a Students must complete specific requirements in the University of Iowa Graduate College after program admission. Refer to the Graduate College website and the Manual of Rules and Regulations for more information.
b Students must complete one of the following sequences: either STAT:4100 and STAT:4101, or STAT:5100 and STAT:5101.
c Students must also satisfactorily complete all degree requirements.
d The final examination is offered in the spring semester of the second year of study. Students who do not succeed on their first attempt may retake the exam once.
e Requires faculty advisor approval.