“In the forefront of actuarial folklore stands the belief that the actuarial examinations constitute a mystery impenetrable by mortal man.” Charles A. Spoerl, *Transactions of the Society of Actuaries*, Volume 1 (1949)

“The primary unifying force of the actuarial profession in North America is the shared experience of the actuarial exams. These difficult and competitive exams . . . yield a bond among actuaries that is stronger and longer lasting than that produced by the entry trials of other professions and careers. Actuaries are unique in the extent to which they remember and discuss their qualifying process, contribute their time to the education and examinations of prospective actuaries, and share a sense of community with those who have traveled the same road. The exams are sufficiently difficult to produce a sense of accomplishment best appreciated by other successful candidates.” Society of Actuaries Task Force on the Actuary of the Future (1988)

**Some Facts**: The University of Iowa (UI) has the second oldest actuarial science program in the U.S.A. It began with the course “The Mathematical Theory of Insurance,” taught by Dr. Westfall, in academic year 1902/1903. Since 1913, actuarial science courses have been taught every year at UI. Five past presidents of the Society of Actuaries and two past presidents of the Casualty Actuarial Society were UI students. The total number of new Fellows of the Society of Actuaries (FSA) in 2000 to 2015 is 10,367, of these 237 were students of UI. [http://www.stat.uiowa.edu/fellows-society-actuaries-fsa](http://www.stat.uiowa.edu/fellows-society-actuaries-fsa) In other words, UI has produced about 2.23% of all new FSA’s.

### Required Courses for the BS degree in Actuarial Science

- CS:1210 (22C:016) Computer Science I: Fundamentals (4 s.h.)
- ECON:1100 (06E:001) Principles of Microeconomics (4 s.h.)
- ECON:1200 (06E:002) Principles of Macroeconomics (4 s.h.)
- MATH:1850 (22M:025) Calculus I (4 s.h.)
- MATH:1860 (22M:026) Calculus II (4 s.h.)
- MATH:2700 (22M:027) Introduction to Linear Algebra (4 s.h.)
- MATH:2850 (22M:028) Calculus III (4 s.h.)
- MATH:3770 (22M:055) Fundamental Properties of Spaces and Functions I (4 s.h.)
- STAT:3100 (22S:130) Introduction to Mathematical Statistics I (3 s.h.)
- STAT:3101 (22S:131) Introduction to Mathematical Statistics II (3 s.h.)
- STAT:4100 (22S:153) Mathematical Statistics I (3 s.h.)
- STAT:4101 (22S:154) Mathematical Statistics II (3 s.h.)
- ACTS:3080 (22S:180) Mathematics of Finance I (3 s.h.)
- ACTS:4130 (22S:174) Quantitative Methods for Actuaries (3 s.h.)
- ACTS:4180 (22S:181) Life Contingencies I (3 s.h.)
- ACTS:4280 (22S:182) Life Contingencies II (3 s.h.)
- ACTS:4380 (22S:183) Mathematics of Finance II (3 s.h.)

ACTS:4280 (3 s.h.) may be substituted with both ACTS:6480 (22S:177) Loss Distributions (3 s.h.) and ACTS:6580 (22S:176) Credibility and Survival Analysis (3 s.h.).

MATH:3600 (22M:100) Introduction to Ordinary Differential Equations (useful for life contingencies and mathematical finance) and STAT:6300 (22S:195) Probability and Stochastic Processes I are recommended. For satisfying the General Education Program requirements in Natural Sciences, calculus-based courses such as PHYS:1611, 1612 (029:081, 082) are recommended.
Sample Schedule

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MATH:1850 Calculus I</td>
<td>MATH:1860 Calculus II</td>
</tr>
<tr>
<td></td>
<td>CS:1210 Computer Science I: Fundamentals</td>
<td>MATH:2700 Introduction to Linear Algebra</td>
</tr>
<tr>
<td></td>
<td>ECON:1100 Principles of Microeconomics</td>
<td>ECON:1200 Principles of Macroeconomics</td>
</tr>
<tr>
<td>2</td>
<td>MATH:2850 Calculus III</td>
<td>MATH:3770 Fundamental Properties of Spaces and</td>
</tr>
<tr>
<td></td>
<td>STAT:3100 Introduction to Mathematical Statistics I</td>
<td>Functions I</td>
</tr>
<tr>
<td></td>
<td>(Exam P)</td>
<td>STAT:3101 Introduction to Mathematical Statistics II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ACTS:3080 Mathematics of Finance I (Exam FM)</td>
</tr>
<tr>
<td>3</td>
<td>ACTS:3080 Mathematics of Finance I (Exam FM)</td>
<td>STAT:4101 Mathematical Statistics II</td>
</tr>
<tr>
<td></td>
<td>STAT:4100 Mathematical Statistics I</td>
<td>ACTS:4180 Life Contingencies I (Exam MLC)</td>
</tr>
<tr>
<td></td>
<td>ACTS:4380 Mathematics of Finance II (Exam MFE)</td>
<td>ACTS:4380 Mathematics of Finance II (Exam MFE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FIN:3300 Corporate Finance (for VEE)</td>
</tr>
<tr>
<td>4</td>
<td>ACTS:4280 Life Contingencies II (Exam MLC)</td>
<td>ACTS:4380 Mathematics of Finance II (Exam MFE)</td>
</tr>
<tr>
<td></td>
<td>ACTS:4380 Mathematics of Finance II (Exam MFE)</td>
<td>ACTS:6480 Loss Distributions (Exam C)</td>
</tr>
<tr>
<td></td>
<td>STAT:4510 Regression, Time Series and Forecasting (Exam SRM)</td>
<td>ACTS:6580 Credibility and Survival Analysis (Exam C)</td>
</tr>
</tbody>
</table>

- ACTS:3080 is offered in both semesters. It appears twice in the table above. Most undergrads will take it in the spring semester of their sophomore year, while transfer students will probably take it in the fall semester of their junior year. Some freshmen may receive permission to take it in the spring semester.
- ACTS:4380 is offered in both semesters. It appears in four places above. Most undergrads will take it in the spring semester of their junior year.
- All other actuarial science (ACTS) courses listed above are offered only once a year.

Graduation with Honors in Actuarial Science
To graduate with honors in Actuarial Science, a student must maintain a GPA of at least 3.40 in departmental courses and complete the following five courses in addition to all courses required for the major.

- FIN:3300 (06F:117) Corporate Finance 3 s.h.
- MATH:3600 (22M:100) Introduction to Ordinary Differential Equations 3 s.h.
- STAT:4510 (22S:150) Regression, Time Series, and Forecasting 3 s.h.

or STAT:3200 (which has STAT:2010 as pre-requisite) and STAT:6560

- ACTS:6480 (22S:177) Loss Distributions 3 s.h.
- ACTS:6580 (22S:176) Survival Analysis and Loss Distributions 3 s.h.

Here is the procedure to register for FIN:3300 Corporate Finance. E-mail a request with a preferred section number to: bev-berg@uiowa.edu State whether you are an Actuarial Science student (MS or Undergraduate) and give your UI student number.
Once the request is approved, you will receive an e-mail that you have permission. No permission code will be needed for registration. Note that space is limited. You should take FIN:3300 only after you have finished ACTS:3080, unless you have the regular pre-requisites for FIN:3300.

Second Major in Mathematics (Program C)
For this major, you need to take two more Mathematics courses, a post-calculus course and an upper-level course. MATH:3600 (22M:100) Introduction to Ordinary Differential Equations (useful for life contingencies and mathematical finance) is highly recommended as the post-calculus course. Consider taking MATH:4820/CS:4720 (22M:174/CS:174) Optimization Techniques as the upper-level course, but note that it has MATH:3800/CS:3700 (22M:072/CS:072) Elementary Numerical Analysis, which is not counted as an upper-level course, as pre-requisite. (Two decades ago, there were actuarial examinations based on topics in optimization and numerical analysis.) You may want to get the BA, not the BS, in Math because it seems more impressive to append the letters “BA, BS” after your name than just “BS.”

Second Major in Statistics (Mathematical Statistics)
Students interested in working for property & casualty insurance companies should consider getting this second major.
STAT:2010 (22S:030) Statistical Methods and Computing
STAT:3200 (22S:152) Applied Linear Regression (pre-requisite is STAT:2010)
STAT:3210 (22S:158) Experimental Design and Analysis
STAT:6300 (22S:195) Probability and Stochastic Processes I recommended

Large Data Analysis Certificate
STAT:2010 (22S:030) Statistical Methods and Computing
STAT:3200 (22S:152) Applied Linear Regression (pre-requisite is STAT:2010)
Three “Level II” courses such as
  • MATH:3800/CS:3700 Elementary Numerical Analysis
  • MATH:4820/CS:4720 Optimization Techniques
  • MSCI:3200 Database Management
CS/MSCI:4480 Knowledge Discovery
CS/MATH/STAT:4740 Large Data Analysis (capstone course)
http://www.stat.uiowa.edu/undergraduate-programs/large-data-analysis-certificate

Risk Management and Insurance Certificate
Offered through the Vaughan Institute of Risk Management and Insurance of our business college
FIN:3400 (06F:102) Principles of Risk Management and Insurance
Two of FIN:4420, 4430, 4440, 4450
For additional information and a curriculum overview, see RMI advisor Bryce Parker bryce-parker@uiowa.edu 319 335 1015

Minor in Business Administration
ACCT:2100 (06A:001) Introduction to Financial Accounting
ACCT:2200 (06A:002) Managerial Accounting
FIN:3000 (06F:100) Introductory Financial Management or FIN:3300 (06F:117)
The following table shows how six Society of Actuaries examinations (effective mid-2018) are covered by UI courses.

<table>
<thead>
<tr>
<th>SOA Examinations</th>
<th>UI Courses</th>
<th>Supplementary</th>
</tr>
</thead>
<tbody>
<tr>
<td>P  Probability</td>
<td>STAT:3100, ACTS:3110</td>
<td>STAT:4100</td>
</tr>
<tr>
<td>FM  Financial Mathematics</td>
<td>ACTS:3080, 3210</td>
<td></td>
</tr>
<tr>
<td>MFE Investment &amp; Financial Markets</td>
<td>ACTS:4380</td>
<td>FIN:3200, 4210, MATH:4250</td>
</tr>
<tr>
<td>MLC Long-Term Actuarial Mathematics</td>
<td>ACTS:4130, 4180, 4280</td>
<td></td>
</tr>
<tr>
<td>C  Short-Term Actuarial Mathematics</td>
<td>STAT:4101, ACTS:6480, 6580</td>
<td></td>
</tr>
<tr>
<td>SRM Statistics for Risk Modeling</td>
<td>STAT:4510</td>
<td>STAT:6560</td>
</tr>
</tbody>
</table>

ACTS:3110 and 3210 are one-hour pass/fail prep courses for Exams P and FM, respectively.

The following table shows how the three Validation by Educational Experience (VEE) requirements (effective mid-2018) can be satisfied by UI courses.

<table>
<thead>
<tr>
<th>VEE</th>
<th>UI Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics</td>
<td>ECON:1100, 1200 or ECON:3100, 3120</td>
</tr>
<tr>
<td>Accounting &amp; Corporate Finance</td>
<td>ACCT:2100, FIN:3000 or 3300</td>
</tr>
<tr>
<td>Mathematical Statistics</td>
<td>STAT:3100, 3101 or STAT:4100, 4101</td>
</tr>
</tbody>
</table>

For other ways to satisfy the VEE requirements, see [https://www.soa.org/Education/Exam-Req/Instructions-for-VEE-Directory.aspx](https://www.soa.org/Education/Exam-Req/Instructions-for-VEE-Directory.aspx)

The Society of Actuaries will make a substantial revision to its curriculum for the ASA designation in mid-2018. Some information can be found in [https://www.soa.org/curriculum-changes/curriculum-changes-default/](https://www.soa.org/curriculum-changes/curriculum-changes-default/)

The Casualty Actuarial Society offers a four-hour multiple choice examination on statistics and probabilistic models, called Exam S. It has four parts: Probability Models (Stochastic Processes and Survival Models), Statistics, Extended Linear Models, and Time Series with Constant Variance. Most of the topics in this exam are covered in STAT:4100, 4101, 4510, 6300 & 6560 and ACTS:4130 & 4180. Students interested in working for property/casualty insurance companies may want to obtain a second major in Statistics.
Exams P and FM, easiest of all actuarial examinations, are offered six times each year. Exam P is offered in January, March, May, July, September, and November, and FM in February, April, June, August, October, and December. To help you pass these two examinations, we have two pass/fail 1 s.h. prep courses, ACTS:3110 and 3210. The exams are not ordered; you can write P before FM, or FM before P. As P and FM are based on introductory courses, some recruiters expect their applicants to have at least passed these two examinations. There is no public record of how many times a student has attempted an actuarial examination; in other words, failing an actuarial exam has no penalty other than the exam fee. These are multiple choice examinations; you can always be lucky. There is a Prometric Test Center in Coralville.

For more information about the professional exams, go to


**Gamma Iota Sigma** is an international risk management, insurance and actuarial science collegiate fraternity. Its purpose is to encourage, enhance, and sustain student interest and professionalism in insurance, risk management and actuarial science programs. By utilizing the valuable resources of Gamma Iota Sigma, members will establish a strong network and distinguish themselves as young risk management & insurance professionals. The Beta Alpha Chapter at the University of Iowa was chartered in April 2007.

https://tippie.uiowa.edu/content/gamma-iota-sigma