

# University of Iowa (UI) Courses and Society of Actuaries (SOA) Examinations

“In the forefront of actuarial folklore stands the belief that the actuarial examinations constitute a mystery impenetrable by mortal man. Perhaps the vitality of this myth may be ascribed to the undeniable attraction it holds for the successful Fellow.”

*Transactions of the Society of Actuaries* Volume 1 (1949) page 42

The diagram below shows the new requirements for the associateship credential of the SOA.

FOUNDATIONS	ACTUARIAL I	ACTUARIAL II	ADVANCED	PROFESSIONALISM
EXAM FINANCIAL MATHEMATICS	EXAM FUNDAMENTALS OF ACTUARIAL MATHEMATICS	EXAM ADVANCED LONG-TERM ACTUARIAL MATHEMATICS OR ADVANCED SHORT-TERM ACTUARIAL MATHEMATICS	e-LEARNING FUNDAMENTALS OF ACTUARIAL PRACTICE	SEMINAR ASSOCIATESHIP PROFESSIONALISM COURSE
EXAM PROBABILITY	VEE MATHEMATICAL STATISTICS	EXAM PREDICTIVE ANALYTICS	e-LEARNING ADVANCED TOPICS IN PREDICTIVE ANALYTICS	
VEE ECONOMICS				
VEE ACCOUNTING AND FINANCE	EXAM STATISTICS FOR RISK MODELING			
e-LEARNING PRE-ACTUARIAL FOUNDATIONS	e-LEARNING ACTUARIAL SCIENCE FOUNDATIONS			

## Required courses for the B.S. degree in Actuarial Science

For the BS degree in Actuarial Science, students are to take the following courses, in addition to those for General Education requirements.

- CS:1210 Computer Science I: Fundamentals (4 s.h.)
- MATH:1850 Calculus I (4 s.h.)
- MATH:1860 Calculus II (4 s.h.)
- MATH:2700 Introduction to Linear Algebra (4 s.h.)
- MATH:2850 Calculus III (4 s.h.)
- MATH:3770 Fundamental Properties of Spaces and Functions I (4 s.h.)
- STAT:3100 Introduction to Mathematical Statistics I (3 s.h.)
- STAT:3101 Introduction to Mathematical Statistics II (3 s.h.)
- STAT:4100 Mathematical Statistics I (3 s.h.)
- STAT:4101 Mathematical Statistics II (3 s.h.)
- ACTS:3080 Mathematics of Finance I (3 s.h.)
- ACTS:4130 Quantitative Methods for Actuaries (3 s.h.)
- **ACTS:4150** Fundamentals of Short-term Actuarial Mathematics (3 s.h.)
- ACTS:4180 Life Contingencies I (3 s.h.)
- ACTS:4280 Life Contingencies II (3 s.h.)

The requirement of the new course **ACTS:4150** can be satisfied by the old course ACTS:4380 or ACTS:4160 (Spring 2022). The requirement of ACTS:4280 can be replaced by taking **both** STAT:4560 Statistics for Risk Modeling I and STAT:4561 Statistics for Risk Modeling II. In exceptional cases, the advisor may waive STAT:3100 and/or STAT:3101. STAT:3120 is not sufficiently rigorous to be a replacement for STAT:3100 and 3101.

The required MATH courses above will qualify you for a Minor in Mathematics. You can get a B.A. degree in Mathematics (Program C) by taking two more MATH courses – a post-calculus course (MATH:3600 or MATH:3800) and an upper-level MATH course. For satisfying the General Education requirements in Natural Sciences, calculus-based courses such as PHYS:1701, 1702 are recommended.

### Graduation with Honors in Actuarial Science

To graduate with Honors in Actuarial Science, a student must complete the following five courses in addition to all courses required for the major (including ACTS:4280). Also, the student must maintain a GPA of at least 3.40 in departmental courses and a UI cumulative GPA of 3.33.

- ACTS:6200 Predictive Analytics (3 s.h.)
- FIN:3300 Corporate Finance (3 s.h.)
- MATH:3600 Introduction to Ordinary Differential Equations (3 s.h.)
- STAT:4560 Statistics for Risk Modeling I (3 s.h.)
- STAT:4561 Statistics for Risk Modeling II (3 s.h.)

In some circumstances, the advisor may permit substitution.

### Correspondence between SOA exams and UI courses

SOA Examinations	UI Courses
Financial Mathematics (FM)	ACTS:3080
Probability (P)	STAT:3100 and/or 4100; <b>ACTS:3110</b>
Fundamentals of Short-term Actuarial Mathematics (FAM-S)	STAT:4101 or 5101; ACTS:4150
Fundamentals of Long-term Actuarial Mathematics (FAM-L) & Advanced Long-term Actuarial Mathematics (ALTAM)	ACTS:4130, 4180 & 4280; STAT:4101
Statistics for Risk Modeling (SRM)	STAT:4560 and 4561
Predictive Analytics (PA), <b>which is about computer applications of the theory in SRM.</b>	ACTS:6200

### SOA's Validation by Educational Experience (VEE) Requirements

The following table shows how SOA's VEE requirements can be satisfied by UI courses (B-grade or higher), Advanced Placement Examinations (grade 4 or 5), or College Level Examination Program Tests (grade between 53 and 80).

VEE	UI Courses	AP Exams	CLEP Tests
Accounting & Finance	ACCT:2100, FIN:3300		Financial Accounting
Economics	ECON:1100, 1200 or ECON:3100, 3150	Micro, Macro	Micro, Macro
Mathematical Statistics	STAT:3101 or 4101 or 5101		

The SOA accepts courses taken at other universities or community colleges; see SOA's "VEE Directory of Approved Courses and Alternate Options." Also, [see the answer to "Can I use transferred courses for VEE credit?"](#) For VEE, online courses are fine.

## A Sample Plan

Below is a sample plan of study for the B.S. degree in Actuarial Science for a student who needs to start from Calculus I. General Education requirement courses are not shown. The courses in **red** are not required for the B.S. degree. However, you are strongly encouraged to take them because they help you pass SOA exams. They are also part of the requirement for Honors in the Major.

Year	Fall Semester	Spring Semester
1	CS:1210 Computer Science I: Fundamentals MATH:1850 Calculus I	MATH:1860 Calculus II MATH:2700 Introduction to Linear Algebra
2	ACTS:3080 Mathematics of Finance I MATH:2850 Calculus III STAT:3100 Introduction to Mathematical Statistics I	MATH:3770 Fundamental Properties of Spaces and Functions I STAT:3101 Introduction to Mathematical Statistics II
3	ACTS:4130 Quantitative Methods for Actuaries STAT:4100 Mathematical Statistics I	ACTS:4150 Fundamentals of Short-term Actuarial Math ACTS:4180 Life Contingencies I STAT:4101 Mathematical Statistics II
4	ACTS:4280 Life Contingencies II STAT:4560 Statistics for Risk Modeling I	ACTS:6200 Predictive Analytics STAT:4561 Statistics for Risk Modeling II

### Notes

- (i) ACTS:3110, 3210, 4130, 4150, 4180, 4280, 6200, and STAT:3100, 3101, 4100, 4101, 4560 and 4561 are offered only once each year. **Currently, we are not planning to offer ACTS:3080 in spring 2023. If a sophomore is unable to take ACTS:3080 in fall 2022, then the student will take it in fall 2023, simultaneously with ACTS:4130.** The business courses, ACCT:2100 and FIN:3300, are usually offered in fall, spring, and summer semesters; they may also be offered in DOE (Distance and Online Education) mode. For SOA's VEE, online courses are okay.
- (ii) For actuarial science majors, ACTS:3080 serves as pre-requisite for FIN:3300; there is not need to take FIN:3000. See the "Corporate Finance Information" section in <https://stat.uiowa.edu/registration-information-fall-2022> FIN:3300 satisfies the SOA VEE corporate finance requirement. It is also a course required for Honors in Actuarial Science.
- (iii) Exams FM and P, 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. These two exams are not ordered; you can write P before FM, or FM before P. 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. The nearest Prometric Test Center is in Hiawatha. To help you prepare for Exam P, we offer a pass/fail 1 s.h. prep course ACTS:3110.
- (iv) For new first-year undergraduates who are Honors Program members, our Department is offering a new seminar course, STAT:1000 First-year seminar: Lectures in probability (1 s.h.).

## Other Information

We have applied to the SOA for **University-Earned Credit (UEC)** for the following four exams: FM (ACTS:3080), FAM (ACTS:4130 & 4150), ALTAM (ACTS:4280), and SRM (STAT:4560 & 4561). The SOA conducted a site visit in April, and we should hear from them before the fall semester begins.

This year, the annual **Actuarial Science, Insurance and Risk Management Career Fair** will be held on Wednesday, September 28, 1:00-4:00 pm, in IMU. Mark this on your calendar.

**Second Major in Mathematics (Program C)** For this major, you only need to take two more MATH courses – a post-calculus course (MATH:3600 or MATH:3800) and an upper-level MATH course. If you do not want to take more MATH courses, apply for a Minor in Mathematics.

**Second Major in Statistics** There are three tracks. The “Mathematical Statistics” track has the least number of additional courses for you; for the third STAT elective, choose STAT:4560 Statistics for Risk Modeling I or STAT:6300 Probability and Stochastic Processes I. Because new ASA’s will have to pass Exams FAM-S, SRM, PA, and ATPA, they will have mastered an enormous amount of statistics. The BS degree in Statistics does not seem to have much value to actuarial employers anymore. The course STAT:3200 Applied Linear Regression is mostly a subset of STAT:4560, which you should take because of Exam SRM. The course STAT:3210 Experimental Design and Analysis is not useful to most actuaries.

### **Second Major in [Data Science](#)**

**Minor in [Computer Science](#)** Choose CS:3330 Algorithms and CS:3700/MATH:3800 Elementary Numerical Analysis.

**[Risk Management and Insurance Certificate](#)** Offered through Vaughan Institute of Risk Management and Insurance, Tippie College of Business. Contact Mr. Todd Jones [todd-jones@uiowa.edu](mailto:todd-jones@uiowa.edu)

### **[Minor in Business Administration](#)**

**B.S./M.S. programs** There are two combined B.S./M.S. programs available to actuarial science students. The [M.S. degrees are offered by our business college](#). One is **M.S. in Business Analytics** and the other is **M.S. in Finance**. It may be possible to complete both B.S. and M.S. degrees in five years, instead of the usual six.

**[Gamma Iota Sigma](#)** is an international risk management, insurance and actuarial science collegiate fraternity. The Beta Alpha Chapter at UI was chartered in April 2007.

### **Lists of Credentialed UI Alumni**

<https://stat.uiowa.edu/associates-society-actuaries-asa>

<https://stat.uiowa.edu/fellows-society-actuaries-fsa>

<https://stat.uiowa.edu/associates-casualty-actuarial-society-acas>

<https://stat.uiowa.edu/fellows-casualty-actuarial-society-fcas>

**Work hard so that your name will be recorded on two of the lists above.** If you want to see how your classmates are doing, use <http://www.actuarial-lookup.com/>

**Some Facts:** The University of Iowa 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 (SOA) and two past presidents of the Casualty Actuarial Society (CAS) were UI students. In 2009 the SOA established the “Center of Actuarial Excellence” designation; UI was among the first group of universities granted this honor. Four SOA Presidential Awards were given in 2017; three of the four awardees were UI graduates. The total number of new Fellows of the Society of Actuaries (FSA) from 2000 to 2021 was 15,628, of which 335 were UI students. In other words, in these 22 years UI has ‘produced’ **2.14%** of all new FSA’s. The number of new Fellows of the Casualty Actuarial Society (FCAS) from UI in these 22 years was 47. Thus, on the average, UI has been ‘producing’ about 17.4 new Fellows (FSA + FCAS) each year in the past two decades.

Our Pomerantz Career Center has a [website summarizing employment data](#) of UI’s recent graduates. It shows that Actuarial Science graduates’ *median starting salary* is \$70,000, which is the **highest** among all majors and programs in CLAS and Tippie College of Business. Actually, the starting salary for Actuarial Science majors should be several thousand dollars higher, because many would write another exam in the summer immediately after graduation.