

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 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 | | | |
| VEE ECONOMICS | | EXAM PREDICTIVE ANALYTICS | e-LEARNING ADVANCED TOPICS IN PREDICTIVE ANALYTICS | |
| 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 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 listed above will qualify you for a Minor in Mathematics. You can get a B.A. degree in Mathematics (Program C) by taking three more MATH courses – MATH:3600, 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; ACTS:3110 |
| Fundamentals of Short-term Actuarial Mathematics (FAM-S) | ACTS:4150; STAT:4101 |
| Fundamentals of Long-term Actuarial Mathematics (FAM-L) & Advanced Long-term Actuarial Mathematics (ALTAM) | ACTS:4130, 4180 and 4280; STAT:4101 |
| Statistics for Risk Modeling (SRM) | STAT:4560 and 4561; STAT:4101 |
| Predictive Analytics (PA), which is about computer applications of the theory in SRM. | 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. Although the courses in **red** are not required for the B.S. degree, you are strongly encouraged to take them.

| Year | Fall Semester | Spring Semester |
|------|---|--|
| 1 | ACTS:1001 Introductory Seminar Actuarial Science CS:1210 Computer Science I: Fundamentals MATH:1850 Calculus I | MATH:1860 Calculus II MATH:2700 Introduction to Linear Algebra |
| 2 | MATH:2850 Calculus III STAT:3100 Introduction to Mathematical Statistics I | ACTS:3080 Mathematics of Finance 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, 4130, 4150, 4180, 4280, 6200, and STAT:3100, 3101, 4100, 4101, 4560, 4561 are offered only once each year. ACTS:3080 are offered each fall and each spring. The business college courses, ACCT:2100 and FIN:3300, are usually offered in fall, spring, and summer semesters; they may also be offered in Distance and Online Education (DOE) 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 no need to take FIN:3000. FIN:3300 satisfies the SOA VEE corporate finance requirement. Use the form <https://students.tippie.uiowa.edu/undergraduates/academics/advising/non-tippie-students/enroll-request> For the question "I have checked the course prerequisites on MYUI and I have met them" answer Yes. The additional information you provide is that you are an Actuarial Science Major and have taken ACTS:3080.
- (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. In 2014, our annual **Actuarial Science, Insurance and Risk Management Career Fair** will be held in the afternoon of September 18. It will be helpful if you have passed some actuarial exam(s) by then.
- (iv) The SOA has granted us **University-Earned Credit (UEC)** status for four exams: FM (ACTS:3080), FAM (ACTS:4130 & 4150), ALTAM (ACTS:4280), and SRM (STAT:4560 & 4561). To obtain UEC exemption for an exam, a student must score at least 85% in the corresponding university course(s). More information about SOA's UEC program can be found in <https://www.soa.org/education/resources/uec/uec-program/>

Other Information

Second Major in Mathematics (Program C) For this major, you take three more MATH courses - MATH:3600, MATH:3800/CS:3700, and an upper-level MATH course such as MATH:4250 or MATH:4820/CS4730. 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 required course STAT:3210 Experimental Design and Analysis is not useful to most actuaries.

Second Major in [Data Science](https://stat.uiowa.edu/5-year-combined-bachelors-and-masters-degree-joint-bsms-data-science) Information about **U2G Data Science** can be found in <https://stat.uiowa.edu/5-year-combined-bachelors-and-masters-degree-joint-bsms-data-science>

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

[Risk Management and Insurance Certificate](#) or **Second Major in Risk Management and Insurance** Offered by Vaughan Institute of Risk Management and Insurance, Tippie College of Business.

[Minor in Business Administration](#)

B.S./M.S. programs There are several combined B.S./M.S. programs available to actuarial science students. One is [U2G Data Science](#) offered by our Department. The business college offers two MS degrees, **M.S. in Business Analytics** and **M.S. in Finance**.

[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.

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 given this honor. In 2022 the SOA granted us University-Earned Credit (UEC) status for four examinations.

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 2023 was 17,651, of which 362 were UI students. In other words, in these 24 years UI has ‘produced’ **2.05%** of all new FSA’s. The number of new Fellows of the Casualty Actuarial Society (FCAS) from UI in these 24 years was 53. Thus, on the average, UI has been ‘producing’ about 17.29 new Fellows (FSA + FCAS) each year in the past two decades.

The following statements are from *Iowa Economic Development Authority*: “In 2020 Iowa’s insurance industry output as a percentage of the state’s total Gross Domestic Product (GDP) was 11.00%, ranking it highest among the 50 states. ... As of October 4, 2021, Iowa has 209 domiciled insurers. ... annual economic activity of over \$18.6 billion in 2020.” We like to think that the vibrant insurance industry in the state of Iowa has a lot to do with the existence of UI’s actuarial science program.

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 \$80,000, which is the **highest** among all majors and programs in CLAS, College of Business, and College of Engineering.