

Actuarial Science, BS

Learning Outcomes

Students 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 Bachelor of Science with a major in actuarial science requires a minimum of 120 s.h., including 52 s.h. of work for the major. Students must maintain a grade-point average of at least 2.00 in all courses for the major and in all UI courses for the major. They must also complete the College of Liberal Arts and Sciences GE CLAS Core.

In planning coursework, students should be guided by the College of Liberal Arts and Sciences maximum hours rule: students earning a BS may apply a maximum of 56 s.h. earned in one department to the minimum 120 s.h. required for graduation, whether or not the coursework is accepted toward requirements for the major; students who earn more than 56 s.h. from one department may use the additional semester hours to satisfy requirements for the major (if the department accepts them), and the grades they earn become part of their grade-point average, but they cannot apply the additional semester hours to the minimum 120 s.h. required for graduation.

The program prepares students for careers as actuaries. It also helps them learn material that is included in professional examinations administered by professional organizations such as the Society of Actuaries and the Casualty Actuarial Society.

Students take a variety of actuarial science courses. They prepare for business aspects of the actuarial profession by studying accounting, law, finance, insurance, and economics. They also complete courses that enhance important communication skills, such as writing and speaking, as part of their GE CLAS Core requirements.

Courses Required for the Major

The BS with a major in actuarial science requires the following coursework. Permission to substitute coursework taken at another institution for required courses at the University of Iowa is decided case by case; students should contact the department.

| Course # | Title | Hours |
|-------------------------|-------|-------|
| Computer Science | | |
| This course: | | |

| | | |
|---------|----------------------------------|---|
| CS:1210 | Computer Science I: Fundamentals | 4 |
|---------|----------------------------------|---|

Mathematics

| | | |
|---------------|--------------------------------|---|
| All of these: | | |
| MATH:1850 | Calculus I | 4 |
| MATH:1860 | Calculus II | 4 |
| MATH:2700 | Introduction to Linear Algebra | 4 |
| MATH:2850 | Calculus III | 4 |
| MATH:3770 | Foundations of Analysis | 4 |

Statistics and Actuarial Science

| | | |
|-------------------------|--|---|
| All of these: | | |
| ACTS:3080 | Mathematics of Finance I | 3 |
| ACTS:4130 | Quantitative Methods for Actuaries | 3 |
| ACTS:4150 | Fundamentals of Short-Term Actuarial Mathematics | 3 |
| ACTS:4180 | Life Contingencies I | 3 |
| ACTS:4280 | Life Contingencies II | 3 |
| STAT:3100/ IGPI:3100 | Introduction to Mathematical Statistics I | 4 |
| STAT:3101/ IGPI:3101 | Introduction to Mathematical Statistics II | 3 |
| STAT:4100/ IGPI:4100 | Statistical Inference I | 3 |
| STAT:4101/ IGPI:4101 | Statistical Inference II | 3 |

In exceptional cases, the advisor may grant permission to waive STAT:3100 Introduction to Mathematical Statistics I and/or STAT:3101 Introduction to Mathematical Statistics II.

Students may choose to complete STAT:4560 Statistics for Risk Modeling I and STAT:4561 Statistics for Risk Modeling II (both courses) instead of ACTS:4280 Life Contingencies II, except honors students, who must complete all three courses.

Honors

Honors in the Major

Students majoring in actuarial science have the opportunity to graduate with honors in the major. They must maintain a UI cumulative grade-point average (GPA) of at least 3.33 and a GPA of at least 3.40 in all departmental courses. They must also complete the following five courses in addition to all courses required for the major.

| Course # | Title | Hours |
|-----------|---|-------|
| ACTS:6200 | Predictive Analytics | 3 |
| FIN:3300 | Corporate Finance | 3 |
| MATH:3600 | Introduction to Ordinary Differential Equations | 3 |
| STAT:4560 | Statistics for Risk Modeling I | 3 |
| STAT:4561 | Statistics for Risk Modeling II | 3 |

University of Iowa Honors Program

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the university's honors program.

Membership in the UI Honors Program is not required to earn honors in the actuarial science major.

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 University of Iowa graduates find work as actuaries, but some become financial managers or 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

Four-Year Graduation Plan

The following checkpoints list the minimum requirements students must complete by certain semesters in order to stay on the university's Four-Year Graduation Plan. Courses in the major are those required to complete the major; they may be offered by departments other than the major department.

Much of the coursework is sequential, so students must begin requirements for the major as soon as possible. Individual study plans must be made carefully. Students who first enroll for a spring semester must consult their advisor to confirm a four-year plan.

Before the third semester begins: MATH:1860 Calculus II and MATH:2700 Introduction to Linear Algebra.

Before the fifth semester begins: MATH:2850 Calculus III, MATH:3770 Foundations of Analysis, STAT:3100 Introduction to Mathematical Statistics I, STAT:3101 Introduction to Mathematical Statistics II, and ACTS:3080 Mathematics of Finance I.

Before the seventh semester begins: STAT:4101 Statistical Inference II, ACTS:4130 Quantitative Methods for Actuaries, ACTS:4150 Fundamentals of Short-Term Actuarial Mathematics, ACTS:4180 Life Contingencies I, and at least 90 s.h. earned toward the degree.

Before the eighth semester begins: ACTS:4280 Life Contingencies II.

During the eighth semester: enrollment in all remaining coursework in the major, all remaining GE CLAS Core courses, and a sufficient number of semester hours to graduate.

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.

Actuarial Science, BS

| Course | Title | Hours |
|--|--|--------------|
| Academic Career | | |
| Any Semester | | |
| Students who major in Actuarial Science BS program will have to perform well to make progress towards the degree. Many courses have minimum grade requirements in prerequisite courses. ^a | | |
| GE CLAS Core: Sustainability ^b | | |
| Hours | | 0 |
| First Year | | |
| Fall | | |
| CS:1210 | Computer Science I: Fundamentals ^c | 4 |
| MATH:1850 | Calculus I ^d | 4 |
| ENGL:1200 or RHET:1030 | Interpreting Literature or Rhetoric: Writing and Communication | 3 - 4 |
| ACTS:1001 | Introductory Seminar on Actuarial Science ^e | 1 |
| CSI:1600 | Success at Iowa | 1 |
| Attend the Actuarial Science, Insurance and Risk Management Job Fair during the fall semester to apply for summer internships. | | |
| Hours | | 13-14 |
| Spring | | |
| MATH:1860 | Calculus II | 4 |
| MATH:2700 | Introduction to Linear Algebra | 4 |
| ACTS:1001 | Introductory Seminar on Actuarial Science ^e | 1 |
| RHET:1030 or ENGL:1200 | Rhetoric: Writing and Communication or Interpreting Literature | 3 - 4 |
| GE CLAS Core: Understanding Cultural Perspectives ^f | | |
| Hours | | 15-16 |
| Second Year | | |
| Fall | | |
| ACTS:3110 | Actuarial Exam P Preparation ^e | 1 |
| MATH:2850 | Calculus III | 4 |
| STAT:3100 | Introduction to Mathematical Statistics I ^g | 4 |
| GE CLAS Core: Natural Sciences without Lab ^f | | |
| GE CLAS Core: World Languages First Level Proficiency or elective course ^h | | |
| Attend the Actuarial Science, Insurance and Risk Management Job Fair during the fall semester to apply for summer internships. | | |
| Hours | | 16-17 |
| Spring | | |
| ACTS:3080 | Mathematics of Finance I | 3 |
| ACTS:3210 | Actuarial Exam FM Preparation ^e | 1 |
| MATH:3770 | Foundations of Analysis | 4 |
| STAT:3101 | Introduction to Mathematical Statistics II ⁱ | 3 |
| GE CLAS Core: World Languages Second Level Proficiency or elective course ^h | | |
| Hours | | 15-16 |

Third Year**Fall**

| | | |
|--|---|-------|
| ACTS:4130 | Quantitative Methods for Actuaries ^g | 3 |
| STAT:4100 | Statistical Inference I ^g | 3 |
| GE CLAS Core: Natural Sciences with Lab ^f | | 4 |
| GE CLAS Core: World Languages Third Level Proficiency or elective course ^h | | 4 - 5 |
| Elective course ⁱ | | 3 |
| Attend the Actuarial Science, Insurance and Risk Management Job Fair during the fall semester to apply for summer internships. | | |

Hours 17-18

Spring

| | | |
|--|---|-------|
| ACTS:4150 | Fundamentals of Short-Term Actuarial Mathematics ⁱ | 3 |
| ACTS:4180 | Life Contingencies I ⁱ | 3 |
| STAT:4101 | Statistical Inference II ⁱ | 3 |
| GE CLAS Core: Literary, Visual, and Performing Arts ^f | | 3 |
| GE CLAS Core: World Languages Fourth Level Proficiency or elective course ^h | | 4 - 5 |

Hours 16-17

Fourth Year**Fall**

| | | |
|--|--|---|
| ACTS:4280 | Life Contingencies II ^{g, k} | 3 |
| STAT:4560 | Statistics for Risk Modeling I ^{j, l} | 3 |
| GE CLAS Core: International and Global Issues ^f | | 3 |
| GE CLAS Core: Social Sciences ^f | | 3 |
| Elective course ^j | | 3 |
| Attend the Actuarial Science, Insurance and Risk Management Job Fair during the fall semester. | | |

Hours 15

Spring

| | | |
|--|---|---|
| ACTS:6200 | Predictive Analytics ^{j, l} | 3 |
| STAT:4561 | Statistics for Risk Modeling II ^{j, l} | 3 |
| GE CLAS Core: Values and Society ^f | | 3 |
| GE CLAS Core: Historical Perspectives ^f | | 3 |
| Elective course ^j | | 3 |

Degree Application: apply on MyUI before deadline (typically in February for spring, September for fall)^m

Hours 15

Total Hours 122-128

- a The Academic Advising Center advises Actuarial Science students on prerequisite course planning. Students are advised for success, based on academic strength, not necessarily for a four-year plan. Prerequisites may take more than one and a half years to complete.
- b Sustainability must be completed by choosing a course that has been approved for Sustainability AND for one of these General Education areas: Natural Sciences; Quantitative or Formal Reasoning; Social Sciences; Historical Perspectives; International and Global Issues; Literary, Visual, and Performing Arts; or Values and Society.
- c Enrollment in this course requires completion of a placement exam.
- d Enrollment in math courses requires completion of a placement exam.
- e This course is not required for the major but it is strongly encouraged to be taken as an elective.

f GE CLAS Core courses may be completed in any order unless used as a prerequisite for another course. Students should consult with an advisor about the best sequencing of courses.

g Typically this course is offered in fall semesters only. Check MyUI for course availability since offerings are subject to change.

h Students who have completed four levels of a single language or two levels of two different languages in high school or college have satisfied the GE CLAS Core World Languages requirement. Students who have completed three levels of a single language may complete a fourth-level course in the same language or may choose an approved World Language and Cultural Exploration course. Enrollment in world languages courses requires a placement exam, unless enrolling in a first-semester-level course. Contact your academic advisor or CLAS Undergraduate Programs Office with questions concerning the World Languages requirement.

i Typically this course is offered in spring semesters only. Check MyUI for course availability since offerings are subject to change.

j Students may use elective courses to earn credit towards the total s.h. required for graduation or to complete a double major, minors, or certificates.

k Students may choose to complete STAT:4560 and STAT:4561 (both courses) instead of ACTS:4280, except honors students, who must complete all three courses.

l This course is a recommended elective, not a requirement. Students may choose another elective. Prerequisites may apply.

m Please see Academic Calendar, on Office of the Registrar website, for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor or Degree Services.