ACTUARIAL SCIENCE

Actuaries have a deep understanding of finance, business, mathematics, and statistics. With this knowledge, they help businesses measure and manage risk, develop new products, and make strategic value-enhancing decisions. In high demand, actuaries work for and with businesses engaged in many different types of activities, including life, health, and property-casualty insurance, banking, investments, financial services, government, energy, e-commerce, marketing, and consulting.

Students studying actuarial science will acquire the knowledge base and skills in finance, mathematics, and statistics needed to pass the preliminary actuarial exams offered by the Society of Actuaries and Casualty Society of America, while acquiring essential business skills to be successful in the field.

Undergraduate Major

The Department of Finance in the Ivy College of Business offers a major in actuarial science. Students will complete the business general education requirements (including business foundation courses), supporting courses/major prerequisites, business core requirements for the bachelor of science (B.S.) degree, and 23 additional credits in the major.

The actuarial science major, intended for students with strong quantitative backgrounds and interest in business, has the goal of educating students in business and risk management, while providing the background and training needed for certification as an actuary (via the 5 preliminary exams of the profession). The major is an excellent opportunity for individuals who want to use advanced technical and analytical skills to solve important business problems.

Certificate

The certificate in actuarial science is available from the College of Liberal Arts and Sciences for non-actuarial science majors at Iowa State (or students who hold a baccalaureate degree from an accredited institution). The certificate requires 23 credits from a designated list of courses, of which 9 credits must stand-alone. There are 9 prerequisite courses required for the certificate’s required courses.

The certificate is intended for students who wish to prepare for a career in the field while obtaining the advanced technical and analytical skills in their chosen major. Students studying mathematics, statistics, or other quantitative STEM disciplines will find their primary coursework matches well with the prerequisites and courses required for the certificate. Students completing the certificate will have sufficient background to pass the first 4 preliminary exams of the profession, along with applying actuarial mathematics to problems in finance, investments, and risk analysis for a broad range of businesses and consumers.

For undergraduate curriculum in business, major in actuarial science.

The Department of Finance offers a major in actuarial science. Students will complete the general education requirements (including business foundation courses), supporting courses/major prerequisites, business core requirements for the bachelor of science (B.S.) degree, and 23 additional credits in the major.

Actuaries measure and manage risk and work for and with businesses with a financial focus, such as finance and insurance. The actuarial science program provides a background in probability, statistics, finance, and actuarial mathematics to enable students to pass the 5 preliminary exams offered by the Society of Actuaries and Casualty Society of America. After completion of this program, students will acquire the business-related skills needed to be a successful actuary. These include the ability to: understand how a business is organized and functions; communicate effectively in written, oral, visual, and electronic modes; work in teams; make ethical choices; use quantitative and analytical methods to address unstructured business problems; think critically; understand financial statements; and understand markets and investments.

Areas of study in the field of actuarial science include interest theory, theory of probability, financial futures and options, loss models, credibility theory, and mathematics of life contingencies.

The instructional objective of the Actuarial Science program is to provide a well-rounded professional business education in actuarial science. Such a program will provide the student with:

1. a mastery of actuarial concepts and methods of analysis
2. a basic understanding of insurance operations in a global setting and of the role of financial institutions in the economy
3. an ability to effectively communicate and work with others as an actuary
4. an ability to demonstrate leadership capabilities in actuarial, financial analysis, and portfolio management.

For more information on the undergraduate major in Actuarial Science, please visit: https://ivybusiness.iastate.edu/degree/actuarial-science/

Student Learning Outcomes

Upon graduation, undergraduate students majoring in Actuarial Science will:

1. Be effective communicators
2. Be effective collaborators
3. Be problem solvers
4. Understand business concepts
5. Recognize ethical and legal responsibilities to organizations
Curriculum:
While the General Education Requirements for Actuarial Science majors remains the same as all other Business majors, there are specific changes in the following areas that must be completed in order to receive a Bachelor's degree in Actuarial Science:

Foundation: (21)
- BUSAD 102 or BUSAD 103 Orientation
- BUSAD 203 Professional Development in Business
- COM S 113 Introduction to Spreadsheets and Databases
- MATH 165 Calculus I
- ECON 101 Principles of Microeconomics
- ECON 102 Principles of Macroeconomics
- STAT 226 Introduction to Business Statistics I
- ACCT 284 Financial Accounting

Supporting Courses: (17)
- ACCT 215 Legal Environment of Business
- MATH 166 Calculus II
- MATH 207 Matrices and Linear Algebra
- MATH 265 Calculus III
- PHIL 230 Moral Theory and Practice

Business Core: (27)
- ACCT 285 Managerial Accounting
- ENTSP 310 Entrepreneurship and Innovation
- FIN 301 Principles of Finance
- MGMT 371 Organizational Behavior
- MGMT 372 Ethical and Responsible Management
- MIS 301 Management Information Systems
- MKT 340 Principles of Marketing
- SCM 301 Supply Chain Management

Above courses are prerequisites and must be taken prior to:
- MATH 441 Life Contingencies I
- ACSCI 402 Credibility Theory
- Elective Courses:
The following electives are highly recommended for Actuarial Science majors:
- ACSCI 391 Actuarial Exam P Lab
- ACSCI 392 Actuarial Exam FM Lab
- FIN 310 Corporate Finance
- FIN 424 Financial Futures and Options
- MATH 442 Life Contingencies II

Students are limited to three business majors/degrees/minors within the Ivy College of Business. This limit is on business majors/degrees/minors only, and does not apply to multiple majors/degrees/minors taken outside the Ivy College of Business.

Actuarial Science, B.S.

Sample 4-Year Plan (Your plan may differ)

Freshman
Fall Credits
- BUSAD 102 or 103 1
- ECON 101* 3
- COM S 113 3
- MATH 165 4
- PHIL 230 3

Spring Credits
- ACCT 284* 3
- MATH 166 4
- STAT 226 3
- BUSAD 203 1

Sophomore
Fall Credits
- ACCT 285 3
- MATH 240 4
- MATH 265 4
- FIN 301* 3

Spring Credits
- Business Core Course 6
- STAT 341 4
- ENGL 250 3
- Global/International Perspective© 3

Recommended ACSCI elective from list
- (Students should take FM exam during winter break)
- (Students should take P exam summer after sophomore year)

Junior
Fall Credits
- MATH 207 3

Credits

Credits

Credits
ACSCI 401  3  ACSCI 402  3
Business Core Course  3  STAT 342*  4
SP CM 312  3  Business Core Course  3
Natural Science  3  US Diversity#  3
(Students should take IFM (or STAM) exam summer after junior year)

15  16

Senior
Fall
Credits
Spring
Credits

MATH 441  3  Global/International Perspective®
Business Core Courses  3  ACCT 215  3
ENGL 302  3  MGMT 478**  3
HUM/SOC SCI  3  General Elective  3
Recommended ACSCI elective from list  2 (Students should take LTAM exam)
(Students should take STAM (or IFM) exam during winter break)

14  12

Total Credits: 122

@  Courses in these requirements may also be used as Global Perspective.
#  US Diversity courses may be used to satisfy HUM/SOC SCI.
*  Validation of Educational Experience courses
**  Must have credit or enrollment in all core courses listed above, except for MGMT 372, plus senior standing, in order to enroll in MGMT 478.

FM  = Financial Mathematics exam
P  = Probability exam
IFM  = Investments & Financial Markets exam
STAM  = Short-Term Actuarial Mathematics exam
LTAM  = Long-Term Actuarial Mathematics exam

Graduation Requirements:

1. Grade of "C" or higher in at least 30 credits of Core and Major courses.
2. 42 credits of 300+ level courses from a four-year institution.
3. 50% of required Business courses must be earned at ISU.
4. At least 32 credits and the LAST 32 credits must be earned at ISU (exceptions for study abroad and internship may be requested).
5. 131 Credits minimum and a Cumulative GPA of at least 2.00 with no quality point deficiencies.
6. A grade of C or better in ENGL 250 required, and also in one other required ENGL course.
7. A grade of C- or better in MATH 166 and MATH 265 required.
8. All 300-level and higher business credits must be earned at a four-year college.
9. Multiple business majors must have at least 15 distinct credits in each of the major requirements; when applicable, one course can be shared between business majors; see your advisor regarding multiple business degree requirements.

Undergraduate Certificate
For the undergraduate certificate in actuarial science.

Purpose
The College of Liberal Arts and Sciences offers a certificate in Actuarial Science. It is available to any non-Actuarial Science major (or student who holds a baccalaureate degree from an accredited institution). Students studying mathematics, statistics, or other quantitative STEM disciplines will find their primary coursework matches well with the prerequisites and courses required for the certificate. The certificate provides students with the necessary background in mathematics, statistics, and the basic principles of finance for a career in actuarial science while obtaining advanced technical and analytical skills in their chosen major. Students completing the certificate will have the background to pass 4 of the preliminary exams in the profession, will have obtained the specialized knowledge required for success in the field, and will be prepared to work for and with businesses with a financial focus, such as insurance, banking, and investments.

Learning Outcomes
After completing the certificate in actuarial science, students will:

• master the quantitative and analytical skills required to obtain an entry-level position in the profession,
• have sufficient background to pass the first 3 or 4 professional exams offered by the professional actuarial organizations,
• apply actuarial mathematics to problems in finance, investment, and risk analysis, and
• demonstrate the ability to communicate the results of quantitative analysis, both in writing and orally.

Requirements
The certificate in actuarial science requires the completion of 7 courses, totaling 23 credit hours.
These courses are:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 320</td>
<td>Investments</td>
<td>3</td>
</tr>
<tr>
<td>FIN 424</td>
<td>Financial Futures and Options</td>
<td>3</td>
</tr>
<tr>
<td>MATH 240</td>
<td>Mathematics of Investment and Credit</td>
<td>3</td>
</tr>
<tr>
<td>MATH 441</td>
<td>Life Contingencies I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 442</td>
<td>Life Contingencies II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 341</td>
<td>Introduction to the Theory of Probability and Statistics I</td>
<td>4</td>
</tr>
<tr>
<td>STAT 342</td>
<td>Introduction to the Theory of Probability and Statistics II</td>
<td>4</td>
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</tbody>
</table>

The seven courses in the list above require 9 prerequisite courses. These courses are: ACCT 284, ECON 101, FIN 301, MATH 165, MATH 166, MATH 265, MATH 207 or 317, STAT 226 (or another introductory statistics course: STAT 101, 104, 105, 201, 231, 305, 322 or 330), and STAT 326 (or STAT 301).

In order to be admitted to the certificate program, students must complete ACCT 284, ECON 101, MATH 165, MATH 166, and STAT 226 (or another introductory statistics course) with a cumulative GPA of at least 2.5.

At least 9 credits used for the certificate cannot be used to meet any other department, college or university requirement for the baccalaureate degree except to satisfy the total credit requirement for graduation and to meet credit requirements in courses numbered 300 or above.

Courses for the certificate cannot be taken on a pass/not-pass basis.

A cumulative GPA of at least 2.0 is required in the seven courses for the certificate.