

School of Arts and Sciences

ACTUARIAL MATHEMATICS

www.math.pitt.edu

What is an Actuary?

An actuary is a business professional who provides expert advice and relevant solutions for business and societal problems that involve financial risk. With an academic background that combines mathematics, statistics, economics, business and financial theory, students pursuing a lucrative career as an actuary can find employment opportunities with insurance companies, consulting firms, government, hospital, banks and investment firms. Actuaries have diverse roles and responsibilities. Some include product development and pricing, financial advising and planning, risk management, pension plan design, or asset/fund management and investment. Today, actuaries applying data mining and predictive modeling techniques are even used by Major League Baseball teams to help gain a competitive edge on the playing field. A career as an actuary is better described as a "business" career with a mathematical base than as a "technical" career in mathematics.

The profession has consistently been rated as one of the top careers in the U.S. by the *Jobs Rated Almanac*. Occupations are ranked on the basis of key criteria obtained from the U.S. Bureau of Labor Statistics and the Census Bureau and include environment, income, employment outlook, physical demands and security. Studies also reveal that the profession is more open than others to women and members of under-represented groups.

Actuarial science originated in England in 1792 in the early history of life insurance. Due to the technical nature of the business, the first actuaries were mathematicians, the discipline that continues to produce the majority of actuaries today. Their numerical growth resulted in the formation of the Institute of Actuaries in England in 1848. Eight years later, the Faculty of Actuaries was formed in Scotland. In the U.S., the Actuarial Society of America was formed in 1889 and the American Institute of Actuaries in 1909. The two organizations merged in 1949 to become the Society of Actuaries, the larger of the two recognized professional societies in the U.S. The second, the Casualty Actuarial Society is the organization for those working in automobile, fire, liability insurance and workers' compensation.

How do I become an Actuary?

There are a number of steps that you can take to prepare for a career as an actuary.

In high school:

- Enroll in a strong college preparatory curriculum.
- Take math classes every year including advanced courses such as calculus.
- Enroll in computer science courses to enhance your technology skills.
- Explore colleges and universities that offer actuarial mathematics programs such as that offered by the University of Pittsburgh.

In college:

- Aim for a broad-based education that concentrates on mathematics and business.
- Pursue a degree in actuarial math, but don't rule out the possibility of a dual major that includes economics or finance.
- Include courses in accounting, management, statistics and computer science that will enhance your marketability and career options.
- Take courses in English, speech and business writing that will help hone communications skills that actuaries need.
- Because actuaries are increasingly involved in a growing number of social and political issues, having some background in the social sciences and humanities will make you an even more versatile job candidate.



The Bachelor of Science in Actuarial Mathematics

This program at the University of Pittsburgh has become an attractive option for students with interests in advanced degrees in mathematical and quantitative finance and MBAs, as well as in securing employment in the banking and insurance industries. This multidisciplinary course of studies can be characterized as a degree program in applied mathematics with a focus on financial models. In addition to a core curriculum of mathematics courses, students are required to complete specific course sequences in statistics, economics and computer science.

The capstone courses in the program, Math 1120 & 1121, follow the most recent syllabus, approved by the Society of Actuaries and the Casualty Actuarial Society, for the societies' professional examinations in Financial Mathematics, Financial Economics, and Life Contingencies. The Department organizes seminars, led by local actuaries, to prepare students for taking these professional society examinations as well as their examination in Probability.

Degree Requirements

Requirements include 63 credits, of which 45 will be in mathematics and statistics. The four required economics courses will satisfy the Arts and Sciences related area requirement. Specific requirements are:

Calculus I, II, III—Math 0220, 0230, 0240 (12 cr)

Linear Algebra—Math 0280 or 1180 or 1185 (3 cr)

Ordinary Differential Equations—Math 0290 or Math 1270 (3 cr)

Actuarial Mathematics—Math 1120 and 1121 (6 cr)

Numerical Methods—Math 1070 or 1080 (3 cr)

Applied Mathematics—two courses from among Math 1280, 1360, 1470, 1480 (6 cr)

Industrial Mathematics—Math 1100 (3 cr)

Economics—Econ 0100, 0110, 1100 and 1110 (12 cr)

Computer Science—CS 0007 or CS 0132 (3 cr)

Statistics—Stat 1151, Stat 1152, and either 1631 or 1731 (9 cr)

Business—Bus Fin 1030 or Econ 1440 (3 cr)

To earn the title of "Actuary" students must become an Associate, and ultimately a Fellow, of one of the professional societies, either the Society of Actuaries or the Casualty Actuarial Society, by passing a series of exams administered by them. The exams are progressive, covering a range of subjects and require solid training in calculus, linear algebra, differential equations, probability and statistics, operations research, numerical analysis, economics, finance and insurance law. As you approach completion of your major requirements, or shortly thereafter, you should be prepared to sit for the first three or four of the eight actuarial exams listed above. Working closely with your advisor will help ensure your level of preparation for the exams.

For current news of the Society of Actuaries visit www.soa.org. More details about the Casualty Actuarial Society can be found at www.casact.org.

For more information about the B.S. degree in Actuarial Mathematics contact:

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