
Actuarial Science

Director: *Regis (acting director, Fall 2015), Lurie (on sabbatical Fall 2015)*

Committee on Actuarial Science: *Bobo, DeLiberato, Klimberg, Liebman, Schellhorn*

Program Overview

The Actuarial Science major seeks to build upon the Jesuit tradition of excellence, as embodied in the GEP, by giving students a strong analytical foundation with which to solve the problems encountered in the management of risk. The Actuarial Science major recognizes that success in the actuarial profession derives from the confluence of insightful business perspectives, rigorous analytical reasoning and a love of learning. The Actuarial Science major bridges the traditional distinction at Saint Joseph's between the Haub School of Business and the College of Arts and Sciences. To be a successful actuary, analytical skills developed in mathematics and economics courses found in the College of Arts and Sciences must be combined with a strong business background utilizing Finance and Decision & System Sciences courses in the Haub School of Business. The Actuarial Science major is, of necessity, an inter-college and interdisciplinary program. The actuarial profession stresses the 'love of learning' component not only in word, but also in deed. Actuaries continue to learn throughout their careers and take great pride in passing the strenuous exams their profession requires for certification. The combination of liberal arts Jesuit values with analytical problem solving skills will uniquely position our graduates to assume leadership roles in the field of Actuarial Science.

In addition to the benefits afforded by the Jesuit liberal arts tradition at Saint Joseph's, the Actuarial Science major has three goals specific to the actuarial profession: First is to maintain a high level of analytical training while providing the business perspectives and love of learning necessary for success in the actuarial profession. Second is to prepare students to take the first two actuarial exams. Third is to make certain that students' performance in the three Validation by Educational Experience (VEE) courses is sufficient to receive VEE credit upon completion. Actuarial Science majors will thus be ideally poised to enter the actuarial profession.

Goals and Learning Goals and Objectives for the B.S. in Actuarial Science Program

Goal 1: Students will master the quantitative and analytical skills required to obtain an entry level position in the actuarial science profession.

Objective 1.1: Students will be able to apply and use the fundamentals tools of calculus and the principles of mathematical proofs to solve applied and theoretical mathematical problems.

Objective 1.2: Students will be able to demonstrate mastery of the computational skills used in probability theory as well as the use of discrete and continuous probability distributions to model various applications in the natural sciences, engineering, finance, insurance and the social sciences.

Objective 1.3: Students will be able to demonstrate understanding of concepts of financial mathematics and how these concepts are applied in the calculation of present and accumulated values of cash flows.

Goal 2: Students will have the knowledge to qualify for professional credentials awarded by the Society of Actuaries and the Casualty Actuary Society.

Objective 2.1: Students will be able to demonstrate their knowledge of macro and micro economics, corporate finance and statistical modeling and obtain VEE (validation by experience and education) credit from professional actuarial societies.

Objective 2.2: Students will know the content covered in the first two professional actuarial science examinations.

Goal 3: Students will develop strong communication and interpersonal skills.

Objective 3.1: Students will be able to compile oral presentations and written reports that integrate the best practices of technical writing, business and statistical terminology and critical analysis.

Objective 3.2: Students will be able to actively engage in guest lectures, team projects, campus events and career development workshops.

Goal 4: Students will attain a high level of proficiency in research methodology and computer technology.

Objective 4.1: Students will be able to conduct quantitative research, i.e. select appropriate statistical methodology, use computer software, and make inferences and predictions using data from applications in finance, economics and other disciplines.

Objective 4.2: Students will be able to demonstrate proficiency in the use of computer software such as EXCEL, SPSS and databases. Students will also be able to do basic computer programming.

Requirements for the Actuarial Science Major
GEP Signature Courses (See Curricula): six courses

GEP Variable Courses (See Curricula): six to nine courses, including

Mathematics:

MAT 161 Calculus I

Natural Science:

one semester of any lab-based natural science course (see ILC below)

Social Science:

ECN 101 Introductory Economics (Micro)

GEP Overlays (See Curricula): three courses

GEP Integrative Learning Component: three courses

Economics:

ECN 102 Introductory Economics (Macro)

Mathematics:

MAT 162 Calculus II

Natural Science:

one semester of any lab-based major level natural science course (see GEP Variable Courses above)

GEP: Electives: any seven courses

Major Concentration: fifteen courses, including

CSC 120 Introduction to Computer Programming

MAT 213 Calculus III

MAT 225 Fundamental Ideas of Mathematics

MAT 226 Introduction to Linear Algebra

MAT 321 Probability

MAT 322 Mathematical Statistics

MAT 423 Applied Statistical Methods

FIN 200 Introduction to Finance

FIN 300 Intermediate Finance

RMI 200 Introduction to Insurance

ACC 101 Financial Accounting

ASC 301 Actuarial Probability

ASC 401 Mathematics of Finance

DSS 330 Database Management

And one Mathematics elective chosen from MAT 238, MAT 311, MAT 313, MAT 316 or approved by the Actuarial Science program director.

Satisfactory completion of the Actuarial Science major automatically qualifies the student to apply for a minor in mathematics; subject to the Mathematics minor GPA restrictions (see the Mathematics section of this catalog). Students are ready to take the first and second actuarial exams at the end of their junior and senior years, respectively. Students are encouraged to participate in a summer internship during their junior/senior year. In the past, these internships have proven to be most valuable to students and their subsequent job search.

Minor in Actuarial Science

Advisor: *Lurie*

Learning Goals and Objectives for the minor in Actuarial Science

Goal 1: Students will master the quantitative and analytical skills required to obtain an entry level position in the actuarial science profession.

Objective 1.1: Students will be able to apply and use the fundamentals tools of calculus and the principles of mathematical proofs to solve applied and theoretical mathematical problems.

Objective 1.2: Students will be able to demonstrate mastery of the computational skills used in probability theory as well as the use of discrete and continuous probability distributions to model various applications in the natural sciences, engineering, finance, insurance and the social sciences.

Goal 2: Students will have the knowledge to qualify for professional credentials awarded by the Society of Actuaries and the Casualty Actuary Society.

Objective 2.1: Students will be able to demonstrate their knowledge of macro and micro economics and obtain VEE (validation by experience and education) credit from professional actuarial societies.

Objective 2.2: Students will know the content covered in the first professional actuarial science examination.

Goal 3: Students will attain proficiency in research methodology and computer technology.

Objective 3.1: Students will be able to conduct quantitative research using appropriate statistical methodology.

Objective 3.2: Students will be able to demonstrate proficiency in the use of computer software such as EXCEL and SPSS.

With the approval of the Actuarial Science Director, students may minor in actuarial science. Students desiring to minor in actuarial science must take the following courses:

- ECN 101 and ECN 102
- MAT 161 and MAT 162
- MAT 213, MAT 321, MAT 322, ASC 301, ACC 101, FIN 200

College Honors Requirements

To receive College Honors credit, students undertake two consecutive semesters of course-based research and study that culminates in a senior thesis. For students in the University Honors program, these two courses may be counted toward the eight course Honors requirement. To be eligible for College Honors, a student must have a 3.5 GPA. If you are interested in completing the College Honors project during your senior year, please be in touch with the program director early in the spring semester of your junior year. Specific requirements for the College Honors thesis may be found under Honors Program.

ASC 301 Actuarial Probability (3 credits)

This course provides an introduction to the basic probabilistic principles of insurance and Risk Management. Selected topics are covered to enable the application of probability theory to solve problems found in insurance

and risk management applications. A problem solving approach will be adopted to provide preparation to pass the first actuarial exam co-sponsored by the Casualty Actuarial Society (Part 1) and the Society of Actuaries (Part P).

Prerequisite: MAT 321.

ASC 401 Financial Mathematics of Actuarial Science (3 credits)

This course provides an in depth study of the theory of interest. Topics that will be covered include: calculation of the effective rates of interest and discount, evaluation of accumulated and present values of fixed and variable annuities, solution of interest problems involving unknown time periods and rates, determination of yield rates, amortization of loans and sinking funds, calculation of the price of a bond, and valuation of securities. This course will prepare students for the actuarial science examination in financial mathematics which is co-sponsored by the Casualty Actuarial Society (Part 2) and the Society of Actuaries (Part FM).

Prerequisite: MAT 213.