ACTUARIAL SCIENCES, MS

Actuaries use statistical and data science tools to analyze and plan for future financial situations. The MS program in Actuarial Science is designed to train students in the background knowledge necessary to become an actuary.

Risk analysts and actuaries are expected to earn professional designation from either the Society of Actuaries (http://www.soa.org/) (life and health insurance) or the Casualty Actuarial Society (http://www.casact.org/) (property and casualty insurance). These societies administer a series of examinations that lead to the risk analyst designation, or for actuaries, first to the designation of associate and then to fellow. The initial exams are the same for both societies. The courses required for the MS in Actuarial Science will aid the student in preparing for the first four of the professional societies' examinations and will also satisfy their Validation by Educational Experience (VEE) (https://www.soa.org/education/exam-req/edu-vee.aspx) requirements in economics, corporate finance, and mathematical statistics.

Actuarial Science involves the application of probability theory and risk management to the areas of life and health insurance, property and casualty insurance, pension plans, and other employee benefit plans. Risk analysts and actuaries, who evaluate the long-term financial impact of these plans on both the issuing company and the purchaser or beneficiary of the plan, are employed by insurance companies, consulting firms, large corporations, and governmental agencies. The Masters in Actuarial Science emphasizes the mathematical theory that underlies risk evaluation.

The program accepts properly prepared students who wish to attend on either a part- or full-time basis. Many courses are offered in the evenings to accommodate students who are employed during the day.

Admission

Applicants for admission to graduate work in Actuarial Science must meet the general requirements for admission to graduate work in the University. Students must have completed an undergraduate degree, not necessarily in mathematics, but must have completed linear algebra (equivalent to MATH 246 LINEAR ALGEBRA at Roosevelt) and at least three semesters of calculus (equivalent to MATH 231 CALCULUS I, MATH 232 CALCULUS II, and MATH 233 CALCULUS III at Roosevelt) with grades of C- or higher and with a B (3.0) average. Students who wish to join the MS program but who are lacking some of these courses are encouraged to complete them prior to application, either at Roosevelt or elsewhere.

Prerequisites

Graduate students must satisfactorily complete any courses required of international students by the English Language Program.

Advising

Following acceptance to the program, students meet with the graduate advisor to plan a program of study. All students are required to obtain approval for their course selections each semester. All courses presented for the degree must be approved by the graduate advisor. Up to 9 credit hours of transfer credit may be considered for the program; however, all such credit must be at the graduate level and may not be applied to any other earned degree.

Requirements

- The completed degree requires a total of 33 credit hours of graduate coursework.
- All students must comply with grade requirements in the standard university policy for graduate degrees (https://catalog.roosevelt.edu/graduate/policies/academic-standing/), have a maximum of two grades at the C+ or C level, and have an overall GPA of at least 3.0.
- Students may transfer in up to three 3 credit graduate courses when admitted; these must comply with standard university policy for graduate transfer coursework (https://catalog.roosevelt.edu/graduate/admission/).
- Students who have not taken ACSC 367 FINANCIAL MATH and ACSC 347 PROBABILITY THEORY as undergraduates must choose MATH 467 FINANCIAL MATHEMATICS and MATH 447 ADVANCED PROBABILITY respectively as part of their graduate electives.

In addition to a core of mathematical probability and statistics, candidates should take courses that prepare them for the actuarial professional exams. The electives, therefore, include a combination of math, finance, and economics classes. If any of the core courses were taken as an undergraduate, substitutions may be made from the math electives with the approval of the graduate advisor.

Requirements

The completed degree requires a total of 33 credit hours of graduate coursework; at least one professional actuarial exam also must be taken. Students who have passed the P or FM exam prior to taking MATH 480P ACTUARIAL SCI SEM: EXAM P/1 or MATH 480FM ACTUARIAL SCIENCE SEMINAR must substitute a different elective for this course. Note that ECON 421 MACROECONOMIC THEORY, ECON 423 MICROECONOMIC THEORY, FIN 408 FINANCE FOR DECISION MAKERS, FIN 485 INVESTMENT THEORY, MATH 448 PROBABILITY AND STATISTICS II, ACCT 403 INTRODUCTION TO ACCOUNTING, and ACCT 405 ACCOUNTING FOR EXECUTIVES satisfy the requirements of the Casualty Actuarial Society and Society of Actuaries for Validation by Educational Experience courses provided a grade of B- or higher is achieved. Students are encouraged to complete the VEE requirements; note that many students fulfill a portion of the VEE coursework as undergraduates with courses equivalent to ECON 101 PRINCIPLES OF ECONOMICS I, ECON 102 PRINCIPLES OF ECONOMICS II,ECON 321 INCOME & EMPLOYMENT THEORY, ECON 323 PRICE THEORY, FIN 311 PRINCIPLES OF FINANCE, FIN 312 CORPORATE FINANCE, and ACSC 348 MATHEMATICAL STATISTICS. A list of approved courses may be found on the SOA website.

Code	Title	Credit Hours
Core		
MATH 448	PROBABILITY AND STATISTICS II	3
MATH 480FM	ACTUARIAL SCIENCE SEMINAR	3
MATH 480P	ACTUARIAL SCI SEM: EXAM P/1	3
Electives		
Select four of the following: [2]		12
MATH 409	DATA MINING	
MATH 430	NUMERICAL ANALYSIS [1]	
MATH 446	STOCHASTIC PROCESSES [1]	
MATH 447	ADVANCED PROBABILITY [1,3]	
MATH 449	REGRESSION & TIME SERIES [1]	

MATH 457	ANOVA & EXPERIMENTAL DESIGN [1]	
MATH 467	FINANCIAL MATHEMATICS [3]	
MATH 469	ACTUARIAL MATHEMATICS I [1]	
MATH 470	ACTUARIAL MATHEMATICS II [1]	
MATH 475	DERIVATIVES MARKETS [1]	
MATH 476	LOSS MODELS	
MATH 478	TOPICS IN ACTUARIAL MATH [1]	
MATH 489	SPECIAL TOPICS	
MATH 495	INDEPENDENT STUDY	
MATH 491	INDUSTRIAL APP OF MATH	
Select up to four of the following courses with the remaining in mathematics or in approved cognate fields: [2]		12
ECON 421	MACROECONOMIC THEORY [1]	
ACCT 403	INTRODUCTION TO ACCOUNTING	
or ACCT 405	ACCOUNTING FOR EXECUTIVES	
ECON 423	MICROECONOMIC THEORY [1]	
FIN 408	FINANCE FOR DECISION MAKERS [1]	
FIN 485	INVESTMENT THEORY [1]	
Total Credit Hours		**33**

1 At least six courses must be listed exclusively at the graduate level.
2 Substitutions may be made with advisor approval.
3 Students who have not completed ACSC 367 FINANCIAL MATH or ACSC 347 PROBABILITY THEORY or their equivalents as undergraduates are required to take these as prerequisites for MATH 480FM ACTUARIAL SCIENCE SEMINAR and MATH 480P ACTUARIAL SCI SEM: EXAM P/1 respectively.

Your degree map is a general guide suggesting courses to complete each term on the academic pathway to your degree. It is based on the most current scheduling information from your academic program. Your program's degree map is reviewed annually and updated as schedules change (although you retain the same course requirements as long as you are continuously enrolled in your degree program).

Always work closely with your academic advisor to understand curriculum requirements and scheduling, as each student's academic plan can look slightly different. No more than two grades of C (not C-) may be applied toward the 33 hours used for the degree. A graduate course can only be repeated once; no more than two courses can be repeated.

Year 1

Fall	Credit Hours	Spring	Credit Hours
MATH 467 or MATH 4XX[2]		3 MATH 448	3
MATH 447 or MATH 4XX[2]		3 MATH 480P	3
MATH 4XX		3 MATH 480FM	3
	9		**9**

Year 2

Fall	Credit Hours	Spring	Credit Hours
MATH 4XX		3 MATH 4XX, ECON 4XX, or FIN 4XX[1]	3
MATH 4XX, ECON 4XX, or FIN 4XX[1]		3 MATH 4XX, ECON 4XX, or FIN 4XX[1]	3
MATH 4XX, ECON 4XX, or FIN 4XX[1]		3	
	9		**6**

Total Credit Hours 33

1 ECON/FIN options: ECON 421 MACROECONOMIC THEORY, ECON 423 MICROECONOMIC THEORY, FIN 408 FINANCE FOR DECISION MAKERS or FIN 485 INVESTMENT THEORY Note that students who did not complete accounting as an undergraduate and who wish to take graduate finance courses should register for ACCT 405 ACCOUNTING FOR EXECUTIVES in their first year of study.
2 Students who have not taken ACSC 367 FINANCIAL MATH and ACSC 347 PROBABILITY THEORY as undergraduates must choose MATH 467 FINANCIAL MATHEMATICS and MATH 447 ADVANCED PROBABILITY respectively as part of their graduate electives. These courses are typically offered alternate years, so students should take them as soon as available.