ACTUARIAL SCIENCES, MS

Actuaries use quantitative 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 applied 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. Course offerings are concentrated 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 the prerequisite courses listed below with grades of C- or higher and with a B (3.0) average, as well as any courses required of international students by the English Language Program. It is possible to make up any deficiencies after being admitted as a graduate student, but no credit will be granted towards the degree for meeting these requirements. Students may enroll in prerequisite courses and certain graduate courses concurrently, provided the prerequisites for those graduate courses have been satisfied.

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. 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 must also be taken. Students who have passed the P or FM exam prior to taking MATH 480P or MATH 480FM must substitute a different elective for this course. Note that MATH 449 REGRESSION & TIME SERIES, ECON 421 MACROECONOMIC THEORY, ECON 423 MICROECONOMIC THEORY, FIN 408 FINANCE FOR DECISION MAKERS, and FIN 485 INVESTMENT THEORY 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 ACSC 349 REGRESSION & TIME SERIES, ECON 101 PRINCIPLES OF ECONOMICS I, ECON 102 PRINCIPLES OF ECONOMICS II, FIN 311 PRINCIPLES OF FINANCE, and FIN 312 CORPORATE FINANCE. A list of approved courses may be found on the SOA website.

Core

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MATH 448</td>
<td>PROBABILITY AND STATISTICS II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 480FM</td>
<td>ACTUARIAL SCIENCE SEMINAR</td>
<td>3</td>
</tr>
<tr>
<td>MATH 480P</td>
<td>ACTUARIAL SCI SEM: EXAM P/1</td>
<td>3</td>
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Electives

Select four of the following: 2

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<tr>
<th>Course</th>
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<tr>
<td>MATH 409</td>
<td>DATA MINING</td>
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<tr>
<td>MATH 430</td>
<td>NUMERICAL ANALYSIS</td>
</tr>
<tr>
<td>MATH 446</td>
<td>STOCHASTIC PROCESSES</td>
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For descriptions of these prerequisites, see the undergraduate catalog. Program prerequisites must be completed within the first year (18 credit hours) of coursework. Any prerequisite may be waived by a placement exam.

Graduate students must satisfactorily complete the prerequisite courses with grades of C- or higher and with a B (3.0) average, as well as any courses required of international students by the English Language Program. It is possible to make up any deficiencies after being admitted as a graduate student, but no credit will be granted towards the degree for meeting these requirements. Students may enroll in prerequisite courses and certain graduate courses concurrently, provided the prerequisites for those graduate courses have been satisfied.
MATH 447  ADVANCED PROBABILITY
MATH 449  REGRESSION & TIME SERIES
MATH 457  ANOVA & EXPERIMENTAL DESIGN
MATH 469  ACTUARIAL MATHEMATICS I
MATH 470  ACTUARIAL MATHEMATICS II
MATH 475  DERIVATIVES MARKETS
MATH 476  LOSS MODELS
MATH 478  TOPICS IN ACTUARIAL MATH
MATH 489  SPECIAL TOPICS
MATH 495  INDEPENDENT STUDY

Select up to four of the following courses with the remaining in mathematics or in approved cognate fields:

ECON 421  MACROECONOMIC THEORY
ECON 423  MICROECONOMIC THEORY
FIN 408  FINANCE FOR DECISION MAKERS
FIN 485  INVESTMENT THEORY
FIN 487  DERIVATIVES

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.