

# ACTUARIAL SCIENCE, BS

Risk analysts and actuaries 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 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 major and the minor will aid the student in preparing for the first two of the professional societies' examinations. They 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 major in actuarial science emphasizes the mathematical theory that underlies risk evaluation.

## Admission

Advanced placement in mathematics is possible for well-prepared students.

## Standards

All courses presented for the major and the minor(s) must be completed with grades of C- or higher with an overall GPA of 2.0 in the major. A maximum of two grades of C- may be presented for the major. Repeated courses in the major or minor require specific approval of the department chair. The average grade for all courses taken in actuarial science and mathematics must be C- or higher. Note that although the major only requires a grade of C- or above for graduation, ECON 101 PRINCIPLES OF ECONOMICS I, ECON 102 PRINCIPLES OF ECONOMICS II, FIN 311 PRINCIPLES OF FINANCE, FIN 321 INVESTMENTS, and ACSC 348 MATHEMATICAL STATISTICS must be passed with a grade of B- or above in order to fulfill VEE (Validation by Educational Experience) requirements for the CAS (Casualty Actuarial Society) and the SOA (Society of Actuaries). Students with a grade of C+ or below in any of ECON 101 PRINCIPLES OF ECONOMICS I, ECON 102 PRINCIPLES OF ECONOMICS II, FIN 311 PRINCIPLES OF FINANCE, FIN 321 INVESTMENTS, or ACSC 348 MATHEMATICAL STATISTICS are strongly encouraged to retake the course in order to earn a grade of B- or above.

## Requirements

- At least four courses in Actuarial Science must be completed at Roosevelt University.
- All courses presented for the major must be completed with C- or higher grades with an overall GPA of 2.0 or higher. A maximum of two grades of C- may be presented for the major.
- A student completing a Bachelor of Science degree in Actuarial Science must take at least one professional exam prior to graduation. Proof should be submitted to the department chair.
- All credit must be approved by the department to be applied toward the major.

- At least 60 semester hours must be in actuarial science, mathematics, computer science, natural sciences and/or psychology. (Note that typically fulfilling the standard general education requirements, the major requirements, and the science minor or supporting sequence will result in at least 60 semester hours.)
- The BS degree requires both a minor in Finance (<https://catalog.roosevelt.edu/undergraduate/business/minor/finance-minor-non-business-majors/>) and an additional minor or 15 credit hour supporting sequence in a science. Computer Science is strongly recommended. Approved areas for the BS degree are:
  - Biology (<https://catalog.roosevelt.edu/undergraduate/health-science/minor/biology-minor/>)
  - Chemistry (<https://catalog.roosevelt.edu/undergraduate/health-science/minor/chemistry-minor/>)
  - Computer Science (<https://catalog.roosevelt.edu/undergraduate/health-science/minor/computer-science-minor/>) (courses must be numbered higher than the 115 level.)
  - Mathematics (<https://catalog.roosevelt.edu/undergraduate/health-science/minor/mathematics-minor/>)
  - Physical Science (courses must be at or above PHSC 103 GLOBAL CLIMATE CHANGE)
  - Psychology (<https://catalog.roosevelt.edu/undergraduate/humanities-education-social-sciences/minor/psychology-minor/>)
- Students who transfer in 15 credits in physics may use those for the supporting sequence.

## Recommendations

- Appropriate supporting courses in computer science, economics, and finance are recommended.
- Students should prepare to take an actuarial professional exam early in their degree plan, as this is often a requirement for actuarial internships. Both ACSC 367 FINANCIAL MATH and ACSC 347 PROBABILITY THEORY correspond to the content of the first two of these actuarial professional exams; the corresponding seminar courses ACSC 380FM ACTUARIAL SCIENCE SEMINAR: EXAM FM/2 and ACSC 380P ACTUARIAL SCIENCE SEMINAR: EXAM P/1 aid in exam preparation.
- ACSC 390 INDUSTRIAL RESEARCH PROBLEMS is recommended as an experiential learning course, as is the required ACSC 349 REGRESSION & TIME SERIES course.
- ACSC 348 MATHEMATICAL STATISTICS satisfies the Mathematical Statistics VEE requirement provided a student earns a grade of B- or higher.
- Students are encouraged to do an actuarial, computing, financial, or statistical internship prior to graduation.

Code	Title	Credit Hours
<b>Core</b>		
ACSC 101	ACTUARIAL CAREER	1
MATH 231	CALCULUS I	5
MATH 232	CALCULUS II	5
MATH 233	CALCULUS III	3
ACSC 246	LINEAR ALGEBRA	3
ACSC 347	PROBABILITY THEORY	3
ACSC 348	MATHEMATICAL STATISTICS	3
ACSC 349	REGRESSION & TIME SERIES	3

ACSC 367	FINANCIAL MATH	3
ACSC 380FM	ACTUARIAL SCIENCE SEMINAR:EXAM FM/2	3
or ACSC 380P	ACTUARIAL SCIENCE SEMINAR: EXAM P/1	
Select two of the following:		6
ACSC 309	DATA MINING	
ACSC 323	COOPERATION AND COMPETITION – GAME THEORY AND APPLICATIONS	
ACSC 328	LINEAR PROGRAMMING & OPTIMIZATION	
ACSC 366	ADVANCED EXCEL METHODS	
ACSC 369	MODELS FOR LIFE CONTINGENCIES	
ACSC 378	TOPICS IN ACTUARIAL MATH	
ACSC 380FM	ACTUARIAL SCIENCE SEMINAR:EXAM FM/2	
or ACSC 380P	ACTUARIAL SCIENCE SEMINAR: EXAM P/1	
ACSC 390	INDUSTRIAL RESEARCH PROBLEMS (EXL course)	
<b>VEE requirement (part of Finance minor)</b>		
ECON 101	PRINCIPLES OF ECONOMICS I (fulfills a portion of the social science gen ed requirement)	3
ECON 102	PRINCIPLES OF ECONOMICS II (fulfills a portion of the social science gen ed requirement)	3
FIN 311	PRINCIPLES OF FINANCE	3
FIN 321	INVESTMENTS	3
<b>Additional requirements for the finance minor</b>		
ACCT 210	INTRODUCTION TO FINANCIAL ACCOUNTING	3
FIN 301	MONEY AND BANKING	3
FIN 3XX		3
<b>Required Programming Course</b> <small>May be used as part of the minor/ supporting sequence, if CST is chosen</small>		
CST 150	COMPUTER SCIENCE I	4
<b>Additional science minor or supporting sequence requirements</b>		
Select five sequence courses in an area of science (computer science is recommended)		15
CST 150	COMPUTER SCIENCE I	
CST 250	COMPUTER SCIENCE II <small>recommended</small>	
CST 2XX	COMPUTER SCIENCE ELECTIVE	
CST 309	DATA MINING (Can count either in CST minor or as an ACSC elective, but not both) <small>recommended</small>	
CST 333	DATABASE SYSTEMS <small>recommended</small>	
General Education, University Writing Requirement, and Elective courses		42
<b>Total Credit Hours</b>		<b>120</b>

## CORE Requirements (General Education)

Code	Title	Credit Hours
<b>First Year Success Course or Transfer Success Course</b>		
FYS 101	FIRST YEAR SUCCESS COURSE	1

or TRS 101	TRANSFER SUCCESS 101	
<b>Communication Requirement</b>		
ENG 101	COMPOSITION I: CRITICAL READING & WRITING	3
ENG 102	COMPOSITION II: INTRODUCTION TO ACADEMIC RESEARCH	3
COMM 101	PUBLIC SPEAKING (or program specific CORE communications course)	3
<b>Ideas of Social Justice</b>		
3 credits in coursework categorized as Ideas.		3
<b>Humanities and Fine and Performing Arts</b> <sup>2, 3</sup>		
9 credits from the following subject areas: African-American Studies, Art History, English (excluding ENG 101 and ENG 102), History, Languages, Music, Philosophy, Theatre, Communication and Women's and Gender Studies		9
<b>Mathematics</b>		
MATH 110	QUANTITATIVE LITERACY (or above) <sup>1</sup>	3
<b>Science</b>		
One biological science and one physical science required (one must include a one credit lab).		7-8
<b>Social Sciences</b> <sup>2,3, 4</sup>		
9 credits from the following subject areas: African-American Studies, Criminal Justice, Economics, History, Journalism, Philosophy, Political Science, Psychology, Sociology and Women's and Gender Studies		9
<b>Experiential Learning</b>		
6 credits from coursework categorized as Experiential Learning.		6
<b>Total Credit Hours</b>		<b>47-48</b>

<sup>1</sup> Higher level of Math may be required by major

<sup>2</sup> Coursework must come from outside of students' major discipline

<sup>3</sup> A maximum of 9 credits can be applied from a single discipline towards humanities and social science requirements

<sup>4</sup> Digital Advertising and Public Relations Majors must complete COMM 110 with a grade of C or higher. This course can fulfill one Social Science requirement.

These quantitative requirements also apply to degrees.

- Students must earn a minimum of 120 semester hours.
- Students may apply no more than 60 credit hours of 100-level courses toward the degree.
- Students must apply no fewer than 60 credit hours of 200- and 300-level courses toward the degree.
- Students must have at least 18 credit hours (of the 60 credit hours above) at the 300 level.
- Students may transfer in no more than 70 credit hours from community colleges.
- Students earning less than 60 total hours in residence must take their final 30 hours at Roosevelt University. Note that some majors have additional requirements for RU hours.
- Students must have a grade point average of 2.0 or higher to graduate. Note that some majors have additional GPA requirements.

- Students may apply no more than 51 hours in the major (BA) or 57 hours in the major (BS)

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).

Students should begin and continue in the calculus sequence: MATH 121 COLLEGE ALGEBRA, MATH 122 TRIGONOMETRY AND PRECALCULUS, MATH 231 CALCULUS I, MATH 232 CALCULUS II, MATH 233 CALCULUS III. Students should take ACSC 367 FINANCIAL MATH and ACSC 347 PROBABILITY THEORY as soon as they complete MATH 232 CALCULUS II; note that ACSC 367 FINANCIAL MATH is offered in odd-numbered fall terms, and ACSC 347 PROBABILITY THEORY is offered in even numbered fall terms.

Always work closely with your academic advisor to understand curriculum requirements and scheduling, as each student's academic plan can look slightly different.

#### Year 1

Fall	Credit Hours Spring	Credit Hours
ENG 101	3 ENG 102	3
FYS 101	1 Ideas of Social Justice	3
MATH 121 <sup>4</sup>	3 CST 150	4
ACSC 101	1 MATH 122 <sup>4</sup>	3
Physical Science <sup>1</sup>	3 ECON 102	3
ECON 101	3	
	<b>14</b>	<b>16</b>

#### Year 2

Fall	Credit Hours Spring	Credit Hours
ACCT 210	3 FIN 301	3
MATH 231 <sup>4</sup>	5 MATH 232 <sup>4</sup>	5
COMM 101	3 ACSC 246	3
Humanities #1	3 FIN 311	3
Social Science #3 (ECON 234 recommended)	3	
	<b>17</b>	<b>14</b>

#### Year 3

Fall	Credit Hours Spring	Credit Hours
MATH 233 <sup>4</sup>	3 ACSC 380FM or 380P	3
ACSC 347 <sup>5</sup>	3 FIN 321	3
ACSC 367 <sup>5</sup>	3 Science Minor or Sequence	3
Science Minor or Sequence	3 Experiential Learning #1 (ACSC 390 recommended) <sup>3</sup>	3
Science Minor or Sequence	3 ACSC 348	3
	<b>15</b>	<b>15</b>

#### Year 4

Fall	Credit Hours Spring	Credit Hours
BIOL 111 or 112 <sup>1</sup>	4 ACSC 3XX <sup>2</sup>	3
FIN 3XX <sup>2</sup>	3 ACSC 3XX <sup>2</sup>	3
Humanities Course #2	3 Humanities Course #3	3
Science Minor or Sequence	3 Science Minor or Sequence	3
ACSC 349 (EXL #2)	3 Elective	1
	<b>16</b>	<b>13</b>

#### Total Credit Hours 120

<sup>1</sup> One Natural Science course must have a lab.

<sup>2</sup> Any course at the 300 Level within the discipline.

<sup>3</sup> Experiential Learning class must be 200/300 level. Students are encouraged to take ACSC 390 INDUSTRIAL RESEARCH PROBLEMS in addition to the required ACSC 349 REGRESSION & TIME SERIES course in order to satisfy their Experiential Learning requirements.

<sup>4</sup> Where a student begins their math sequence depends on their placement, so some students will start in MATH 231 CALCULUS I. Students should take the appropriate sequence of courses each semester until they complete MATH 232 CALCULUS II. They should take MATH 233 CALCULUS III in the next possible fall term.

<sup>5</sup> Students should take ACSC 347 PROBABILITY THEORY and ACSC 367 FINANCIAL MATH in the first fall term that occurs after they complete MATH 232 CALCULUS II.