

ACTUARIAL SCIENCE, BA

Actuarial science is the quantitative analysis of risk. In addition to mathematics and statistics courses, students in actuarial science take classes in finance, economics and computer programming.

At many universities, actuarial sciences is housed in the business department. We believe that the most successful actuaries have an extensive foundation in mathematics and in the broader liberal arts, and therefore our program is housed in our Department of Mathematical Sciences.

While you will take several business classes, you will also be heavily exposed to the broader context in which risk exists in our lives. Through economics courses and other courses in the social sciences and humanities, you will see how actuarial science is not practiced in a vacuum but has real-life implications and impact on businesses, individuals, and communities as a whole.

Students interested in actuarial science should make every effort to prepare themselves in high school by taking four years of challenging math classes. Ideally, students will enter college ready to start in the first semester of calculus.

As students progress in our program, they begin to take the professional exams required of actuaries, making themselves more attractive job candidates. Our location in Milwaukee, the largest city in Wisconsin and home to many large and small companies, also gives our students easier access to internships and part-time jobs compared to smaller cities. If you are looking for more advanced training beyond the bachelor's level, explore our Master's of Science in Mathematical Sciences (<http://uwm.edu/math/graduate/programs/ms-program/>). In this program, you can obtain graduate-level training in actuarial science.

Course of Study – Bachelor of Arts Degree

Complete 120 credits including 90 credits in the College of Letters & Science and with 36 of the 90 credits in L&S upper-level (numbered above 300) courses. The College requires that students must complete in residence at UWM at least 15 credits in upper-division (numbered 300 or above) courses in their major. Students are also required to complete University-wide General Education Requirements and the specific L&S requirements listed below.

To complete a major, students must satisfy all the requirements of the major as stated in this catalog. Students who declare their majors within five years of entering the UW System as a degree candidate may satisfy the requirements outlined in any catalog issued since the time they entered. Credits used to satisfy the major also may be used to satisfy other degree requirements.

University General Education Requirements (GER)

Code	Title	Credits
Oral and Written Communication		
<i>Part A</i>		
Achieve a grade of C or better in the following course:		
ENGLISH 102	College Writing and Research (or equivalent)	
<i>Part B</i>		
Course designated as OWC-B; may be completed through a major-specific course requirement		

Quantitative Literacy

Part A

Earn at least 3 credits with a grade of C or higher in one of the following courses or an equivalent course, or achieve a placement code of at least 30 on the mathematics placement test (or other appropriate test, as determined by the Mathematical Sciences Department)

MATH 102	Mathematical Literacy for College Students II
MATH 103	Contemporary Applications of Mathematics
MATH 105	Introduction to College Algebra
MATH 108	Algebraic Literacy II
MATH 111	Introduction to Logic - Critical Reasoning ¹
or PHILOS 111	Introduction to Logic - Critical Reasoning
MATH 116	College Algebra
Or equivalent course	

Part B

Course designated as QL-B; may be completed through a major-specific course requirement

Arts

Select 3 credits 3

Humanities

Select 6 credits 6

Social Sciences

Select 6 credits 6

Natural Sciences

Select 6 credits (at least two courses including one lab) 6

UWM Foreign Language Requirement

Complete Foreign Language Requirement through:

Two years (high school) of a single foreign language

Two semesters (college) of a single foreign language

Or equivalent

UWM Cultural Diversity Requirement

One course from the Arts, Humanities, or Social Sciences must also satisfy UWM's Cultural Diversity requirement

¹ Math 111 and Philosophy 111 are jointly offered and count as repeats of one another. Students cannot receive credit for both courses.

College of Letters & Science Requirements

I. English Composition Requirement

Students must satisfy the English Composition Requirement with one of the following options:

- 1) Completing ENGLISH 102 with a grade of C or higher; or
- 2) by placing beyond ENGLISH 102 on the English Placement Test (EPT) (or other assessment as determined by the English Department); or
- 3) transferring a course of at least 2.5 equivalent credits from another institution that is equivalent to English 102, or a UWM higher-level expository writing course, with a grade of C or higher.

Note: This requirement is the same as the University General Education Requirement for Oral and Written Communication Part A. The College

of Letters & Science does not have a specific requirement for a writing course beyond English 102, but students must complete the university-wide requirement for Oral and Written Communication Part B listed above.

II. Mathematics and Formal Reasoning

To satisfy the Mathematics and Formal Reasoning Requirement, students must satisfy the following two requirements:

1. Achieve a placement code of at least 30 on the mathematics placement test (or other appropriate test, as determined by the Mathematical Sciences Department) or earn at least 3 credits with a grade of C or higher in one of the following courses or an equivalent course:

Code	Title	Credits
MATH 102	Mathematical Literacy for College Students II	3
MATH 103	Contemporary Applications of Mathematics	3
MATH 105	Introduction to College Algebra	3
MATH 108	Algebraic Literacy II	3
MATH 111	Introduction to Logic - Critical Reasoning ¹	3
or PHILOS 111	Introduction to Logic - Critical Reasoning	
MATH 116	College Algebra	3
MATH 175	Mathematical Explorations for Elementary Teachers I	3

¹ Math 111 and Philosophy 111 are jointly offered and count as repeats of one another. Students cannot receive credit for both courses.

Note: This requirement is the same as the University General Education Requirement for Quantitative Literacy Part A, listed above.

2. Complete one course (at least 3 credits) at the 200 level or above chosen from courses in Mathematics, PHILOS 211, or Letters and Science statistics courses:

Code	Title	Credits
Complete one of the following:		
3 or more credits in any 200-level or above Math course		
AFRIC 220	Introduction to Statistics in African and African Diaspora Studies	
ANTHRO 568	Introduction to Anthropological Statistics	
BIO SCI 465	Biostatistics	
ECON 210	Economic Statistics	
GEOG 247	Quantitative Analysis in Geography	
HIST 595	The Quantitative Analysis of Historical Data	
MTHSTAT 215	Elementary Statistical Analysis	
PHILOS 211	Elementary Logic	
POL SCI 390	Political Data Analysis	
POL SCI 392	Survey Research	
PSYCH 210	Psychological Statistics	
SOCIOL 261	Introduction to Statistical Thinking in Sociology	

Note: This requirement is NOT the same as the University General Education Requirement for Quantitative Literacy Part B. To complete the BA, students must take one of the L&S approved courses. **Not all of the courses listed here will satisfy the QL-B requirement.**

III. Foreign Language Requirement

Placement testing may be used to satisfy all or part of this requirement. Language courses (including American Sign Language) other than English taken in high school may be used to satisfy all or part of this requirement. One year of high school language equates to one semester of college work.

Completion of the L&S Language Requirement also satisfies the university-wide Foreign Language GER, but not vice versa.

Code	Title	Credits
Completed in one of the following ways:		0-18
Successful completion of the 4th semester of college work or equivalent in one language other than English (including American Sign Language)		
Successful completion of the 3rd semester of college work or equivalent in one language other than English (including American Sign Language) PLUS the 2nd semester of college work or equivalent in another language other than English (including American Sign Language)		

IV. International Requirement

See Approved Courses for the L&S International Requirement (<https://catalog.uwm.edu/letters-science/approved-courses-international-requirement/>) for course options.

Code	Title	Credits
Completed in one of the following ways:		9
Complete 3 courses (min. 9 cr) in a single foreign language (not including literature-in-translation or American Sign Language) at the 3rd semester level and above		
Complete 3 non-language courses (min. 9 credits) with an international content chosen from at least 2 curricular areas.		
Complete 9 credits in combination of the two options above.		

V. Breadth Requirement

Along with completing the University General Education Requirements of 3 credits in the Arts (A); 6 credits in the Humanities (HU), Social Sciences (SS), and Natural Sciences (NS/NS+); and a course with the Cultural Diversity (CD/+) designation, L&S students must complete the Breadth requirement.

Code	Title	Credits
Arts		
Select 3 credits		3
Humanities		
Complete 12 credits of L&S courses with Humanities Breadth designation; no more than 6 credits from a single subject area. *		12
Social Sciences		
Complete 12 credits of L&S Courses with Social Science Breadth designation; no more than 6 credits from a single curricular area. *		12
Natural Sciences		

Complete 12 credits of L&S Courses with Natural Sciences Breadth designation, including at least one laboratory or field course; no more than 6 credits from a single curricular area.* 12

Cultural Diversity

Complete 3 credits in a course with Cultural Diversity (CD) designation.** 3

* Students should check their course selections carefully with the list of approved L&S Breadth Courses (<https://catalog.uwm.edu/letters-science/breadth-requirement-course-list/>). Students are advised to select at least 6 credits worth of courses in each of the Humanities, Social Science, and Natural Sciences areas that can satisfy both the campus-wide General Education Requirements and the L&S Breadth requirement.

** Students are advised to select a course that satisfies the Cultural Diversity requirement as well as a Humanities or Social Science breadth/GER requirement.

VI. The Major

The College of Letters and Science requires that students attain at least a 2.0 GPA in all credits in the major attempted at UWM. In addition, students must attain a 2.0 GPA on all major credits attempted, including any transfer work. Individual departments or programs may require higher GPAs for graduation. Some departmental majors require courses from other departments. Contact your major department for information on whether those credits will count as part of the major GPA. The College requires that students must complete in residence at UWM at least 15 credits in upper-division (numbered 300 or above) courses in their major.

Research Requirement

Within their majors, students must complete a research experience approved by the L&S faculty. A list of courses satisfying the research requirement in each major can be found here (<https://catalog.uwm.edu/letters-science/approved-courses-research-requirement/>).

VII. The Minor

The College of Letters and Science requires that students attain at least a 2.0 GPA in all credits in the minor attempted at UWM. In addition, students must attain a 2.0 GPA on all minor credits attempted, including any transfer work.

Actuarial Science Major Requirements

Students who intend to complete the BA in Actuarial Science program in four years will need to begin taking mathematics in their first semester. Such students should have a University of Wisconsin-Milwaukee mathematics placement level of 30 (ready for precalculus) or better.

Admission

To be eligible for admission, a student should have completed their Calculus sequence with a GPA of 2.50 or better and MATH 234 or MATH 240. In addition, students should have earned a grade of B- or better in either ACTSCI 391 or MTHSTAT 361, or should have earned a score of 4 or higher on the Society of Actuaries Exam FM or P.

Preparatory Curriculum

Students must complete one of Calculus Sequences: MATH 211 and MATH 212, or MATH 231 (or MATH 213), MATH 232, and MATH 233 (or equivalent). MATH 221 and MATH 222 are equivalent to MATH 231, MATH 232, and MATH 233. Students majoring in actuarial

science must have an average GPA of at least 2.500 in these courses. Additional preparatory curricula are required, as listed below.

Capstone Experience

Students must complete a Capstone Experience. The aim of the capstone experience is to encourage independent learning. Students complete a research paper in the context of this course, which satisfies the L&S research requirement. For Actuarial Science majors, the capstone is ACTSCI 599. Students must obtain consent of the instructor to enroll in ACTSCI 599.

Requirements

Students must complete the courses listed below, including at least 15 upper-division (numbered 300 and above) credits in the major in residence at UWM. The College of Letters & Science requires that students attain at least a 2.0 GPA on all credits in the major attempted at UWM. In addition, students must attain a 2.0 GPA on all major credits attempted, including any transfer work.

Code	Title	Credits
Additional Preparatory Curriculum		
ACTSCI 290	Introduction to Actuarial Science	3
MATH 234	Linear Algebra and Differential Equations	3-4
or MATH 240	Matrices and Applications	
COMPSCI 250	Introductory Computer Programming	3
COMPSCI 251	Intermediate Computer Programming	3
BUS ADM 201	Introduction to Financial Accounting	4
ECON 103	Principles of Microeconomics	3
ECON 104	Principles of Macroeconomics	3
Core Curriculum		
ACTSCI 391	Investment Mathematics I	4
MTHSTAT 361	Introduction to Mathematical Statistics I	3
MTHSTAT 362	Introduction to Mathematical Statistics II	3
BUS ADM 350	Principles of Finance	3
or BUS ADM 450	Intermediate Finance	
ACTSCI 490	Introduction to Actuarial Practice	1
ACTSCI 491	Actuarial Workshop FM	1
ACTSCI 492	Actuarial Workshop P	1
ACTSCI 599	Capstone Experience	1
ACTSCI 593	Actuarial Models I	3
ACTSCI 596	Actuarial Statistics I	3
ACTSCI 594	Actuarial Models II	3
or ACTSCI 597	Actuarial Statistics II	
MTHSTAT 563	Regression Analysis	3
MTHSTAT 564	Time Series Analysis	3
MTHSTAT 568	Multivariate Statistical Analysis	3
Select one of the following three courses:		
ACTSCI 591	Investment Mathematics II	
MATH 583	Introduction to Probability Models	
MTHSTAT 566	Computational Statistics	
Total Credits		60-61

Recommended Electives

To achieve the best preparation for an actuarial career, students actively should pursue internship opportunities with insurance companies, consulting firms, and other organizations that require actuarial science knowledge. Once such an opportunity is secured, the student should enroll in ACTSCI 590. Students also should take courses in business communication (COMMUN 105, ENGLISH 205), computer science (COMPSCI 351, COMPSCI 557), and expand their knowledge in economics (ECON 325, ECON 450).

Professional Development

For future advancement in the field of actuarial science, "Validation by Educational Experience" (VEE) credits are required. VEE credits may be earned from the Society of Actuaries (SOA) and Casualty Actuarial Society (CAS) with a grade of B- or better in the following courses:

Code	Title	Credits
MTHSTAT 362	Introduction to Mathematical Statistics II (VEE-Mathematical Statistics)	3
ECON 103	Principles of Microeconomics (VEE-Economics)	3
ECON 104	Principles of Macroeconomics (VEE-Economics)	3
BUS ADM 201	Introduction to Financial Accounting (VEE-Accounting and Finance)	4
BUS ADM 450	Intermediate Finance (VEE-Accounting and Finance)	3

Courses taken at other universities may be used to meet the VEE requirement of the SOA/CAS.

Students considering a major in Actuarial Science need to come to the department to declare their major and be assigned a faculty advisor. All courses selected for the major must be approved by the advisor, and since **required courses are not offered every semester or year**, students should check regularly with their advisors to plan their courses of study in order to finish in a coherent and timely fashion.

Letters & Science Advising

During your time at UWM, you may have multiple members of your success team, including advisors, peer mentors, and success coaches. Letters and Science students typically work with at least two different types of advisors as they pursue their degrees: professional College Advisors and Faculty Advisors. L&S College Advisors advise across your entire degree program while departmental Faculty Advisors focus on the major.

College Advisors are located in Holton Hall and serve as your primary advisor. They are your point person for your questions about navigating college and completing your degree. College Advisors will:

- assist you in defining your academic and life goals;
- help you create an educational plan that is consistent with those goals;
- assist you in understanding curriculum, major and degree requirements for graduation, as well as university policies and procedures;
- provide you with information about campus and community resources and refer you to those resources as appropriate; and

- monitor your progress toward graduation and completion of requirements.

Faculty Advisors mentor students in the major and assist them in maximizing their development in the program. You will begin working with a Faculty Advisor when you declare your major. Faculty Advisors are an important partner and will:

- help you understand major requirements and course offerings in the department;
- explain opportunities for internships and undergraduate research and guide you in obtaining those experiences; and
- serve as an excellent resource as you consider potential graduate programs and career paths in your field.

Students are encouraged to meet with both their College Advisor and Faculty Advisor at least once each semester. Appointments are available in-person, by phone or by video.

Currently enrolled students should use the Navigate360 website (<https://uwm.edu/navigate360/>) to make an appointment with your assigned advisor or call (414) 229-4654 if you do not currently have an assigned Letters & Science advisor. Prospective students who haven't enrolled in classes yet should call (414) 229-7711 or email let-sci@uwm.edu.

Honors in the Major

Students in Actuarial Science who meet all of the following criteria can be awarded honors in the major upon graduation:

1. A 3.000 cumulative GPA in all UWM graded credits;
2. A 3.500 GPA over all UWM courses counting toward the Actuarial Science major;
3. A 3.500 GPA over all upper-division UWM courses counting toward the Actuarial Science major; and
4. The passing of at least three professional actuarial exams.

Students who believe they may qualify for honors in Actuarial Science should apply to the Mathematical Sciences Department during their last semester of study.

College of Letters and Science Dean's Honor List

GPA of 3.750 or above, earned on a full-time student's GPA on 12 or more graded credits in a given semester.

Honors College Degree and Honors College Degree with Distinction

Granted to graduating seniors who complete Honors College requirements, as listed in the Honors College (<https://catalog.uwm.edu/honors-college/>) section of this site.

Commencement Honors

Students with a cumulative GPA of 3.500 or above, based on a minimum of 40 graded UWM credits earned prior to the final semester, will receive all-university commencement honors and be awarded the traditional gold cord at the December or May Honors Convocation. Please note that for honors calculation, the GPA is **not** rounded and is truncated at the third decimal (e.g., 3.499).

Final Honors

Earned on a minimum of 60 graded UWM credits: Cum Laude - 3.500 or above; Magna Cum Laude - 3.650 or above; Summa Cum Laude - 3.800 or above.