

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.

Requirements

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	
ATM SCI 500	Statistical Methods in Atmospheric Sciences	
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 (<http://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 (<http://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 (<http://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**Preparatory Curriculum**

Students must complete a Calculus Sequence: 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	4
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 or BUS ADM 450	Principles of Finance Intermediate Finance	3
ACTSCI 490	Introduction to Actuarial Practice	1
ACTSCI 491	Actuarial Workshop FM	1
ACTSCI 492	Actuarial Workshop P	1
MATH 571	Introduction to Probability Models	3
ACTSCI 591	Investment Mathematics II	3
ACTSCI 599	Capstone Experience	1
Select One of the Following Two Pairs:		6
ACTSCI 593 & ACTSCI 594	Actuarial Models I and Actuarial Models II	
ACTSCI 596 & ACTSCI 597	Actuarial Statistics I and Actuarial Statistics II	
Select two of the following four courses:		6
MTHSTAT 563	Regression Analysis	
MTHSTAT 564	Time Series Analysis	
MTHSTAT 566	Computational Statistics	
MTHSTAT 568	Multivariate Statistical Analysis	
Total Credits		58

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 361	Introduction to Mathematical Statistics I (VEE-Mathematical Statistics)	3
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

The College of Letters and Science provides general academic advising for all students with a major in the College, particularly as it relates to campus' general education requirements and the College's degree requirements. We also provide specialized advising for pre-professional students (pre-med, pre-dental, pre-pharmacy, etc.) regardless if their major is in Letters and Science or not. Prospective students, including high school students and students seeking to transfer to a program in Letters and Science may also receive advising from our admissions counselors.

Upon admission, students are assigned an advisor in the College advising office. Academic advising is available Monday through Friday from 8:30 a.m. to 4:30 p.m. by appointment. Appointments outside of these times may be available and phone appointments are available for online students. The advising office (<https://uwm.edu/letters-science/advising/contact-advising/>) is located on the first floor of Holton Hall. Current students should call (414) 229-4654 to schedule an appointment or use the Navigate website (<https://uwmilwaukee.campus.eab.com>) to make an appointment with your assigned advisor; online scheduling is only available if you already have a Letters & Science advisor assigned to you. Prospective students should call (414) 229-7711 or email let-sci@uwm.edu.

When students declare a major, they will receive an additional faculty advisor located within the major department who will assist with requirements for that major. Students should read the "Declaration of Major" information on the website of the major that they are interested in. In some cases, the student will need to choose a faculty advisor as part of the declaration process.

All students are cautioned to consult their Letters & Science academic advisor AND their major advisor prior to each registration period to ensure they understand all requirements. Do not rely on pre-printed sample plans, as they are intended to be samples only and may not be right for your particular situation.

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.

Honors in the 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 (<http://catalog.uwm.edu/opportunities-resources/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.

Contact Information

Current Students contact the Math Sci office, math-staff@uwm.edu
Prospective Students contact a Letters & Science Admissions Counselor at
(414) 229-7711 or let-sci@uwm.edu

<http://uwm.edu/math/undergraduate/majors/actuarial-science/>