

TO: College of Arts and Sciences Curriculum Committee

FROM: Alex Smith  
Chair, UWEC Department of Mathematics

DATE: September 19, 2018

RE: Program Change

We request implementation of the following program changes with the next possible *Catalog*.

New Program Approval:  
Actuarial Science Comprehensive Major, Liberal Arts (Code XXX-XXX)

Deletion of Existing Program (pending approval of new Actuarial Science Comprehensive Major):  
Mathematics, Actuarial Science Emphasis, Comprehensive Major, Liberal Arts (Code: 180-001)

Date of Department/Program Approval: September 18, 2018

We are requesting approval of a new standalone Actuarial Science Comprehensive Major to replace the existing Mathematics, Actuarial Science Emphasis, Comprehensive Major. The new standalone comprehensive major will more accurately convey the depth of the existing curriculum and enhance program visibility. Consistent with other majors in the College of Arts and Sciences, students pursuing the new Actuarial Science Comprehensive Major will have the option of pursuing a Bachelor of Science (BS) degree or Bachelor of Arts (BA) degree. Please see the attached document for details:

**Request for Authorization to Implement a Bachelor of Science (BS) and Bachelor of Arts (BA) Degree in Actuarial Science**

**REQUEST FOR AUTHORIZATION TO IMPLEMENT A BACHELOR OF SCIENCE  
AND BACHELOR OF ARTS DEGREE IN ACTUARIAL SCIENCE  
AT UNIVERSITY OF WISCONSIN (UW)-EAU CLAIRE  
PREPARED BY UW-EAU CLAIRE**

**ABSTRACT**

The University of Wisconsin-Eau Claire proposes a new Bachelor of Science (B.S.) and Bachelor of Arts (B.A.) degree in Actuarial Science within the Department of Mathematics. These new majors would replace the existing actuarial science submajors at the university (Mathematics, Actuarial Science Emphasis, Comprehensive Major – B.A. and B.S.). Thus, it is important to note that the proposed degree programs extend from the existing submajors where the curriculum, faculty, and advising support are already in place. The proposed degrees respond to the 41.8% increase in student enrollment in the submajors since 2012. The establishment of new programs in actuarial science will more accurately convey the depth of the existing curriculum and will yield enhanced program visibility that is expected to drive continued increases in new student enrollment. The new programs will also serve to enhance employment opportunities for graduates by ensuring that employers universally understand the depth of the actuarial training that program graduates have received. These programs would be unique relative to existing actuarial programs in the UW System as they would provide a comprehensive curriculum, but would do so in a liberal education setting at a smaller university and metropolitan area. The new programs comprise a minimum of 64 credits of the 120-credit degree, including at least 41 credits of mathematics coursework, 11 credits from the BUSCORE (the common body of courses taken by most Bachelor of Business Administration students), and nine credits of economics and finance coursework. Full-time students will be able to complete all liberal education requirements and other university graduation requirements as part of the proposed degrees within four years. Graduates will be equipped with a blend of technical expertise and business understanding that is necessary for a successful actuarial career.

**PROGRAM IDENTIFICATION**

**Institution Name**

UW-Eau Claire

**Title of Proposed Program**

Actuarial Science

**Degree/Major Designations**

B.S. or B.A.

**Mode of Delivery**

Single institution, using primarily face-to-face instruction.

### Projected Enrollments by Year Five

Table 1 represents enrollment and graduation projections for students entering the proposed actuarial science program over the next five years.

**Table 1:** Five Year Degree Program Enrollment Projections (Headcount)

	Year 1	Year 2	Year 3	Year 4	Year 5
New Students	46	48	53	55	59
Continuing Students	39	64	85	89	94
Total Enrollment	85	112	138	144	153
Graduating Students	0	5	24	24	25

The retention rates utilized in these projections were consistent with retention rates experienced by UW-Eau Claire actuarial science submajors from 2012 through 2017<sup>1</sup>, as illustrated in the following table:

**Table 1a:** Retention of New First-Year and Transfer Students<sup>2</sup>

	Year 2	Year 3	Year 4
New Student Retention	70%	52%	50%
Transfer Student Retention	55%	40%	0%

Since it is anticipated that there will be an influx of students who transfer to the new B.S./B.A. in Actuarial Science, especially amongst those students in the existing submajors, the calculation of continuing students is slightly more complicated than it would be otherwise. A breakdown of the Year 2 enrollment projection is provided below to bring transparency to the calculations (NOTE: all values were rounded up to the nearest integer):

**Table 1b:** Year 2 Enrollment Projection Detail

<b>NEW STUDENTS</b>	
New first-year students	37
New transfer students	11
<b>Total new students</b>	<b>48</b>
<b>CONTINUING STUDENTS</b>	
70% of Year 1 new first-year students	25
52% of Year 0 (2018) new first-year students	19
55% of Year 1 new transfer students	7
40% of Year 0 (2018) new transfer students	5
100% of Year 2 continuing transfer students	5
55% of Year 1 continuing transfer students	3
<b>Total continuing students</b>	<b>64</b>
<b>TOTAL ENROLLMENT</b>	
	<b>112</b>

<sup>1</sup> Office of Institutional Research, UW-Eau Claire.

<sup>2</sup> The retention rate for Year X was calculated as the percentage of Year 1 new or transfer students that were still enrolled in the actuarial science submajor in Year X.

It is anticipated that all Fall 2018 new students (first-year and transfer students) will move to the new programs in Fall 2019. These students will still require Personal Advising Codes (PACs) to register, so the active, intentional advising of these students will successfully transition the Fall 2018 students to the new programs. There is no assumption that students who started before Fall 2018 will switch to the new programs, as the vast majority of those students will not go through the formal advising process.

By the end of year five, it is expected that 261 new students will have enrolled in the program and 78 students will have graduated from the program.

### **Tuition Structure**

Students will be assessed the standard undergraduate tuition and fees. For the 2018-19 academic year, the residential tuition and segregated fees total \$4,410 per semester for a full-time student enrolled in 12-18 credits per term. Of this amount, \$3,680 is attributable to tuition and \$730 (including \$75 textbook rental fee) is attributable to segregated fees. Full-time students will be able to complete all degree requirements in eight semesters. The full cost of tuition for students completing the degree in four years will be \$29,440. Resident students attending part-time may take up to 16 semesters to complete all degree requirements based on course offerings and an average of 6 to 9 credits per semester. In accordance to Regent Policy 32-7, and as previously approved by the Board of Regents, these students will be assessed a differential tuition on a per credit basis. Under that policy, the residential cost of tuition and segregated fees is \$367 per credit.

### **Department or Functional Equivalent**

The proposed programs will reside in the Department of Mathematics and will replace the existing submajors (Mathematics, Actuarial Science Emphasis, Comprehensive Major – B.A. and B.S.).

### **College, School, or Functional Equivalent**

The proposed programs will be housed within the College of Arts and Sciences.

### **Proposed Date of Implementation**

Fall 2019

## **INTRODUCTION**

### **Rationale and Relation to Mission**

UW-Eau Claire's academic master plan can be found here: <http://www.uwec.edu/AcadAff/academic-master-plan/index.htm>. The new B.A./B.S. degree in Actuarial Science will help specifically with the stated goals of recruiting and retaining high-achieving students, and engaging students in high-impact practices. In terms of recruitment and retention, a formal, stand-alone major in actuarial science should attract students who might otherwise overlook the UW-Eau Claire program as being less complete than those offered by other institutions, given the label of "emphasis" assigned to the current program. Students who enter this field are typically quite strong academically – for the Fall 2016 admit term, the average comprehensive ACT score for students admitted with an intent to pursue the actuarial science

comprehensive major was 26.9<sup>3</sup>. Additionally, many actuarial science majors engage in internships with our employer partners. These internships are a designated high-impact practice at UW-Eau Claire, but are not required by the actuarial program and are not a prerequisite for full-time actuarial employment. On average, 51% of minimally qualified<sup>4</sup> students in UW-Eau Claire's actuarial science program experienced an actuarial internship as an undergraduate<sup>5</sup>. Not all minimally qualified students actively pursue an internship, however, so the actual success rate of those who engage in the recruiting process and satisfy all employer requirements is sure to be higher than this figure. One company, Humana, hired five UW-Eau Claire actuarial science students as interns in a single summer. In that year, UW-Eau Claire students constituted 19% of all the company's actuarial interns; a greater representation than any university program in the country.

### **Need as Suggested by Current Student Demand**

As of the Fall 2017 semester, there were 129 students enrolled in the comprehensive actuarial science submajor at UW-Eau Claire with an average of 45.3 new student (first-year students and transfers) enrollments per academic year since the 2012-13 academic year<sup>6</sup>. The Fall 2017 enrollment represents a 41.8% increase over the corresponding total enrollment in the Fall 2012 semester. By comparison, UW-Madison experienced a 26.4% increase in actuarial science majors over the same time frame<sup>7</sup>. While both programs appeared to benefit from the strong job/career rankings for the actuarial profession over this horizon, this comparison indicates that there may have been some university- or program-specific forces yielding the higher growth at UW-Eau Claire. From 2012 to 2017, UW-Eau Claire's program expanded its course offerings to cover additional professional examination topics, added a faculty member with demonstrated actuarial research experience, expanded local and international recruiting efforts, and had several students receive prominent actuarial scholarships/awards. There is no way of knowing exactly how much impact any one of these items may have had on the increased enrollment, but their cumulative effect was likely of material consequence.

Along the path of program growth, visibility and awareness of the UW-Eau Claire programs have emerged as hurdles for continued acceleration in enrollment. These obstacles stem from the technical designation of the programs as submajors. This label no longer appropriately reflects the depth of actuarial study provided by the UW-Eau Claire curriculum, as evidenced by UW-Eau Claire's "Advanced Curriculum" designation from the Society of Actuaries (SOA)<sup>8</sup>. Only 65 colleges or universities in the United States have attained this or a higher designation from the SOA. However, to a prospective student, the label of submajor can give the impression that the UW-Eau Claire programs are not as complete as similar programs

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<sup>3</sup> UW-Eau Claire Admissions Office, Admitted Student Data for Mathematics Programs.

<sup>4</sup> A student is considered "minimally qualified" if they were a U.S. citizen with at least one professional actuarial examination passed at the time of graduation.

<sup>5</sup> UW-Eau Claire Mathematics Department data on actuarial science program graduates, graduation dates between September 2012 and May 2017.

<sup>6</sup> UW-Eau Claire Office of Institutional Research:  
[https://www.uwec.edu/IR/reports/Dashboards/factbook\\_enrollment.htm](https://www.uwec.edu/IR/reports/Dashboards/factbook_enrollment.htm).

<sup>7</sup> Academic Planning and Institutional Research (APIR), Office of the Provost, UW-Madison.  
[https://dataviz.wisc.edu/views/TrendsInStudentEnrollments/HeadcountsofDegree-SeekingStudents?%3Aembed=y&%3AshowShareOptions=true&%3Adisplay\\_count=no&%3AshowVizHome=no](https://dataviz.wisc.edu/views/TrendsInStudentEnrollments/HeadcountsofDegree-SeekingStudents?%3Aembed=y&%3AshowShareOptions=true&%3Adisplay_count=no&%3AshowVizHome=no).

<sup>8</sup> <https://www.soa.org/Education/Resources/Actuarial-Colleges/actuarial-college-listings-details.aspx>

both inside and outside of Wisconsin. Some prospective students are surprised to learn that UW-Eau Claire offers a comprehensive curriculum in actuarial science, since online resources such as the listing of comprehensive majors on the UW-Eau Claire College of Arts and Sciences website<sup>9</sup> shows only “Mathematics” and not “Actuarial Science” due to the technical designation that the programs have outgrown. With approval of this proposal, which would address these primary challenges to continued program growth, we anticipate that new student enrollments will stabilize in the 55-60 student range.

### **Need as Suggested by Market Demand**

The most extensive analysis of market demand for actuaries is contained in a December 2014 report titled, “Actuarial talent: Findings from an EIU study.”<sup>10</sup> This report was commissioned by the Society of Actuaries, the Casualty Actuarial Society, and the Canadian Institute of Actuaries to examine the market for actuarial talent in North America. From 2014 to 2020, the EIU (Economist Intelligence Unit) estimates that actuarial employment in the United States will expand at an average annual rate of 3.4%, yielding a growth in actuarial employment over that time horizon of roughly 5,000. The U.S. Department of Labor’s Bureau of Labor Statistics (BLS) supports this future uptick in actuarial employment. The BLS updated its job outlook for actuaries to reflect 22% growth in actuarial jobs from 2016 to 2026<sup>11</sup>. While this signals a future slowing of the 3.4% annual increases from the EIU report, the growth is still labeled as “Much faster than average” by the BLS Occupational Outlook Handbook. Currently, a global search of “actuary” on the Job Center of Wisconsin website yields 90 openings<sup>12</sup>. According to careercast.com, Actuary was the #1 job of 2015<sup>13</sup>, #10 of 2016<sup>14</sup>, and #11 of 2017<sup>15</sup>. Even in the 2017 rankings where the career fell to its lowest rating since 2009, careercast.com classifies the projected growth in career opportunities as “Very Good,” ranking the career 22<sup>nd</sup> of 199 jobs on this measure.

### **Emerging Knowledge and Advancing New Directions**

The two major actuarial credentialing bodies in the United States – the Society of Actuaries and the Casualty Actuarial Society – recently made changes to the professional actuarial education systems. These changes will yield actuarial candidates with stronger foundations in statistics and predictive analytics in the years to come. While it will take some time for the changes in the examination system to take hold, it seems plausible that they may ultimately position actuaries to meet the increased demand in the fields of statistics and data science, too. These careers were ranked #1 and #5, respectively, in the 2017 careercast.com rankings<sup>16</sup>.

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<sup>9</sup> <https://www.uwec.edu/academics/college-arts-sciences/majors-minors/> (accessed July 5, 2018)

<sup>10</sup> The Economist Intelligence Unit, “Actuarial Talent: Findings from an EIU Study for the Society of Actuaries, Casualty Actuarial Society, and Canadian Institute of Actuaries,” December 2014.

<sup>11</sup> U.S. Department of Labor, Bureau of Labor Statistics, Occupational Outlook Handbook, <https://www.bls.gov/ooh/math/actuaries.htm>.

<sup>12</sup> Jobs Center of Wisconsin, <https://jobcenterofwisconsin.com/> (accessed July 5, 2018).

<sup>13</sup> <https://www.careercast.com/jobs-rated/jobs-rated-report-2015-ranking-top-200-jobs>

<sup>14</sup> <https://www.careercast.com/jobs-rated/jobs-rated-report-2016-ranking-200-jobs>

<sup>15</sup> <https://www.careercast.com/jobs-rated/2017-jobs-rated-report>

<sup>16</sup> <https://www.careercast.com/jobs-rated/2017-jobs-rated-report>

## **DESCRIPTION OF PROGRAM**

### **Institutional Program Array**

The proposed actuarial science programs will reside in the Department of Mathematics within the College of Arts and Sciences at UW-Eau Claire. All coursework proposed for the new programs is already in place and no major course revisions are anticipated for Fall 2019 implementation at this time. The UW-Eau Claire Department of Mathematics has existing coursework in the fields of predictive analytics and data science that can be considered for future incorporation into the actuarial science programs should it be warranted by employer and/or student demand, particularly in light of the new professional actuarial examination topics.

### **Other Programs in the University of Wisconsin System**

Within the University of Wisconsin System, only two other schools offer a stand-alone degree program in actuarial science: UW-Madison and UW-Milwaukee. UW-Eau Claire, by comparison, is quite different both in terms of the size of its student population (10,000 for UW-Eau Claire versus over 40,000 for UW-Madison and over 30,000 for UW-Milwaukee) and city population (68,000 versus 245,000 for Madison and 600,000 for Milwaukee). Some students who want to pursue a degree in actuarial science may not find a bigger city and larger university a good fit. Offering students a third option at UW-Eau Claire presents an alternative that may better align with their preference for a smaller city and/or university.

Additionally, UW-Eau Claire is uniquely positioned to incorporate more predictive analytics and data science coursework into the actuarial science curriculum in the future given its involvement in the collaborative M.S. degree in Data Science coordinated by UW-Extension. UW-Eau Claire has existing coursework, housed in the Department of Mathematics, in these fields that can be leveraged to provide actuarial science students with the new skills that are in increasing demand by employers. In 2017, the Society of Actuaries announced that a formalized predictive analytics assessment was being developed and would be incorporated into the professional designations it offers beginning in 2018. Actuarial programs that can quickly and easily integrate the predictive analytics curriculum and are in position to adapt to the evolving needs for actuaries related to that discipline will see stronger placement of graduates in the years ahead.

### **Diversity**

Faculty in the Actuarial Sciences program and the Department of Mathematics are fully committed to helping students overcome inclusion challenges in actuarial science, including lower participation by members of underrepresented groups such as women and people of color. In part, this commitment is modeled by the diversity of the four faculty members that provide primary support for the actuarial program, which includes two women and one person of color. This commitment is also evident in faculty engagement with the broader community that creates awareness of the program and understanding of the profession. For example, actuarial faculty members have been featured panelists at the Travelers Insurance Actuarial High School Day, giving them the opportunity to connect with a wide array of students from the Minneapolis/St. Paul metropolitan area, including students of color and first-generation students. Faculty presentations in mathematics classes at local high schools provide for similar connection and relationship development. Actuarial faculty have also participated in designated STEM/STEAM

events at area high schools to interact with interested students of all backgrounds. Another example is the annual Sonia Kovalevsky Day, sponsored by the UW-Eau Claire Department of Mathematics, which brings middle and high schools girls from across the region to UW-Eau Claire. This project aims to expose young women to opportunities available in math and science by creating fun and exciting experiences through hands-on activities, workshops, discussions, and a math competition. The project has been especially successful in reaching out to young women of color.

As an advanced curriculum actuarial program, as designated by the SOA, there are other opportunities available to UW-Eau Claire students that can serve to enhance their appreciation of diversity within the profession. For example, in the Fall 2017 semester, UW-Eau Claire provided travel support for a student to attend an International Actuarial Association (IAA) meeting in Chicago, IL. This meeting included a session on “Women Leaders in the Actuarial Profession,” which provided insight on the diversity challenges in the profession related to gender. While practical considerations will limit direct student participation in similar opportunities, key insights can be shared more broadly through presentations during the annual UW-Eau Claire Math Retreat Day or through written reflections made available to all students enrolled in the actuarial program.

The UW-Eau Claire actuarial program also benefits from the diversity of its enrolled students. Approximately 15% (21 of 136) of students who graduated from UW-Eau Claire’s actuarial program from December 2012 to May 2017 were international students<sup>17</sup>. Intentional efforts have been made to strengthen our ties with international partners, especially in Malaysia. In 2016, an actuarial faculty member accompanied a UW-Eau Claire admissions counselor on a trip to Malaysia, providing presentations on the career and answering the questions of prospective students regarding both the university’s program and the profession. Using pedagogical approaches that emphasize the importance and value of teamwork throughout the actuarial curriculum, the perspectives of international students are deliberately incorporated into the experience of all students in the actuarial program.

### **Student Learning Outcomes**

The multidisciplinary major in actuarial science has established the following core learning outcomes: (1) Apply a broad range of perspectives, including numerical, graphical, algebraic, analytical and verbal, to effectively connect and communicate mathematical ideas; (2) Use mathematics to model and solve appropriate problems; (3) Apply probability models to describe random behavior; (4) Use interest theory techniques to value deterministic cash flows; and (5) Apply both probability and theory of interest concepts to model and solve actuarial problems involving contingent cash flows.

The actuarial science program provides students with the knowledge and skills needed for lifelong learning in actuarial science and related fields (e.g., financial engineering, underwriting, risk management, etc.). The actuarial science learning outcomes are directly tied to UW-Eau Claire’s four liberal education learning outcomes (Knowledge, Skills, Responsibility, and Integration) as outlined below:

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<sup>17</sup> UW-Eau Claire Mathematics Department data on actuarial science program graduates, graduation dates between September 2012 and May 2017.

- Knowledge Outcome: build knowledge and awareness of the practical and applied nature of actuarial science.
- Skills Outcome: develop intellectual and practical skills, including, for example: critical thinking, written and oral communication, quantitative literacy, and direct application of probability and theory of interest concepts to the actuarial science topics.
- Responsibility Outcome: apply personal and social responsibility for the implementation of actuarial science concepts in the areas of insurance and risk management.
- Integration Outcome: integrate learning across the courses that constitute the actuarial science program.

The Knowledge outcome is directly connected to actuarial science program outcomes (1) and (2). The Skills outcome is aligned with all five program outcomes. The Responsibility outcome is embedded in program outcomes (2) and (5) while the Integration outcome is the main thrust of program outcome (5).

### **Assessment of Objectives**

The actuarial science program is currently assessed as an emphasis within the mathematics degree through required coursework. As a comprehensive major in Actuarial Science it will be assessed using the existing rubrics and assessment plan. Currently, assessment occurs in Math 216 (Multi-variable Calculus), Math 346 (Introduction to Probability), Math 350 (Introduction to Financial Mathematics) and Math 450 (Foundations of Actuarial Science). The assessment data will be examined each year to inform any curricular or program modifications.

Since the actuarial science program will be housed within the Department of Mathematics, the department's assessment plan will continue to include assessment of the actuarial science major. Currently, a yearly assessment report is provided to the Dean of the College of Arts and Sciences and to the University Assessment Committee. Student outcomes will be further assessed by collecting and reviewing data on job placement, actuarial professional exams passed and eventual professional credentialing of actuarial science graduates.

### **Program Requirements and Curriculum**

The proposed B.S. and B.A. in Actuarial Science is a 64-credit major offered in the Department of Mathematics which resides in the College of Arts and Sciences at UW-Eau Claire. There will be a separate admission into the program. To enter the program, students must meet two requirements: (1) complete at least 15 credits of courses required for the major with a GPA in those courses of at least 3.0; and (2) complete Math 346 (Introduction to Probability) and Math 350 (Introduction to Financial Mathematics) with a grade of B- or better, or earn a passing grade on the corresponding professional actuarial exam(s) administered by the Society of Actuaries and/or the Casualty Actuarial Society (these exams are offered six times per year, without any prerequisite requirements, at a cost to the student of approximately \$200 per attempt). There are no non-course graduation requirements. The program design encourages timely degree completion, while simultaneously providing students with opportunities to participate in high impact practices such as research experiences, internships, case-study competitions and travel to professional conferences. Students in Mathematics, and all other disciplines within the College of Arts and Sciences, can earn either a Bachelor of Arts or Bachelor of Sciences degree, and this opportunity will exist for students in the actuarial science

major. At UW-Eau Claire the requirement for a B.A. degree is met by demonstrating language competency equivalent to a second semester (102 level) foreign language course. The requirement for a B.S. degree is met by demonstrating math competency at the Math 114 (Calculus I) which is a required course for the actuarial science major.

Table 2 illustrates the curriculum for the proposed actuarial science program. Including university and liberal education requirements, the minimum number of credits required to complete the degree is 120 (64 in the major and a minimum of 56 to fulfill the liberal education and university requirements). Of the 64 credits required for the major, a minimum of 41 must be earned via Department of Mathematics coursework, a minimum of 6 credits will be earned via coursework from the Department of Economics, and 14 credits will be earned via coursework from the College of Business.

**Table 2: Curriculum for the Actuarial Science Major**

**University and Liberal Education Requirements Not Met by the Actuarial Science Major:**

Knowledge Goals	16 Credits
Skills Goals	10 Credits
Responsibility Goals	6 Credits
Integration Goal	6 Credits
Other Electives	<u>18 Credits</u>
	<b>56 Credits</b>

**Actuarial Science Course Requirements:**

Math 114 (Calculus I)	4 Credits
Math 150 (Introduction to the Actuarial Career)	1 Credit
Math 215 (Calculus II)	4 Credits
Math 216 (Calculus III)	4 Credits
Math 346 (Introduction to Probability)	4 Credits
Math 347 (Mathematical Statistics)	4 Credits
Math 350 (Introduction to Financial Mathematics)	4 Credits
Math 450 (Foundations of Actuarial Science)	4 Credits
Math 312 (Differential Equations and Linear Algebra) or Math 324 (Linear Algebra and Matrix Theory)	4 Credits
Economics 103 (Principles of Microeconomics) or Economics 303 (Intermediate Microeconomic Theory)	3 Credits
Economics 104 (Principles of Macroeconomics) or Economics 304 (Intermediate Macroeconomic Theory)	3 Credits
Math 441 (Linear Regression Analysis with Time Series) or Economics 316 (Econometrics)	3 Credits
Accounting 201 (Principles of Accounting I)	3 Credits
Information Systems 240 (Information Systems in Business)	3 Credits
Business Communications 206 (Business Writing) or Business Communications 207 (Business Presentations)	2 Credits
Finance 320 (Principles of Finance)	3 Credits

Finance 327 (Long Term Financial Management)	3 Credits
At least two courses from the following:	
Math 460 (Contingent Payment Analysis)	
Math 470 (Mathematical Models for Financial Economics)	
Math 475 (Credibility and Loss Models)	<u>8 Credits</u>
	<b>64 Credits</b>

### Possible Electives:

Information Systems 310 (Systems Analysis and Design)	3 Credits
Information Systems 290 (Introduction to Database Applications)	3 Credits
Information Systems 304 (Fundamentals of Business Programming)	3 Credits
Business Communications 206 (Business Writing)	2 Credits
Business Communications 207 (Business Presentations)	2 Credits
Business Communications 306 (Advanced Business Writing)	2 Credits
Business Communications 307 (Advanced Business Presentations)	2 Credits
Business Communications 308 (Tech. for Business Communication)	2 Credits
Business Communications 405 (Advanced Business Communication)	2 Credits
Math 460 (Contingent Payment Analysis)	4 Credits
Math 470 (Mathematical Models for Financial Economics)	4 Credits
Math 475 (Credibility and Loss Models)	4 Credits

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<b>TOTAL</b>	<b>120 Credits</b>
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### Projected Time to Degree

A well-prepared student, who attends full time, can complete the actuarial science degree, including all liberal education and other UW-Eau Claire graduation requirements, in eight semesters with an average load of 15 credits per semester. The average time-to-degree for new freshmen in the actuarial science program from Fall 2012 to Fall 2014 was 3.8 years<sup>18</sup>. While the major requirements have changed slightly from that time, there have also been reductions in the number of required credits from the university's transition to the new liberal education framework. Taken together, these changes should offset each other, yielding little to no change in the anticipated time-to-degree. Part-time students will require more than eight semesters to complete the program of study. The time that it will take transfer students to complete the degree depends on the classes that they have already completed. Average time-to-degree for transfer students in the actuarial science program from Fall 2012 to Fall 2014 was 2.3 years<sup>19</sup>.

### Program Review

Academic programs are reviewed at UW-Eau Claire every seven years. The mathematics program was last reviewed during the Fall 2013 semester. The review process includes a three-faculty internal review committee and an external evaluator who also participates in a site visit. The perspectives and recommendations for improvement from these reviewers are forwarded to the Academic Policies Committee and Provost for consideration. The proposed actuarial science major would be included in the department's next program review, which is currently scheduled for the 2019-2020 academic year.

<sup>18</sup> Office of Institutional Research, UW-Eau Claire.

<sup>19</sup> Office of Institutional Research, UW-Eau Claire.

**Accreditation**

The proposed degree fits naturally under the approved mission of the UW-Eau Claire and the Department of Mathematics and collaborating departments. Therefore, no separate Higher Learning Commission (HLC) approval will be necessary for this new program.