Date: March 29, 2018
To: Sarah Mangelsdorf, Provost and Vice Chancellor for Academic Affairs
From: Barry Gerhart, Interim Albert O. Nicholas Dean, Wisconsin School of Business
Re: Final Summary of Review for Capstone Certificate in Actuarial Science

The first five-year review of the Capstone Certificate in Actuarial Science program was completed in July 2017 by a committee chaired by Alex Hanhart, Associate Director, Department of Mathematics. Kristin Eschenfelder, GFEC member and Professor in the Information School, and Yazhen Wang, Professor, Department of Statistics, also served on the review committee. The review committee’s charge was to complete the first five-year review of the program by addressing the following specific components: (1) Determine whether the goals and objectives as stated in the original program proposal were met and evaluate if the program is meeting standards of quality that are expected based on the original proposal; (2) Confirm that the program is important for its School and understand the program’s relationship to other programs at UW-Madison; (3) Determine if the resource implications of continuing the program are appropriate; (4) Provide recommendations for improvement; (5) Recommend whether the program should continue. The School of Business APC discussed and approved the committee report on February 16, 2018. Based on my review of the review committee’s report and the APC’s response, I am providing the following executive summary of the program review:

Summary of Strengths and Weaknesses

Program faculty have taken actions to ensure program quality, and student satisfaction is good. However, the program is not as large as initially planned. The projected enrollment was an entering class of 5 to 10 students, growing to 25 to 30 students. The program has had an average of 15.5 students per year and awards an average of 7.4 certificates per year. This has not been sufficient to meet a goal of hiring new faculty, but it has produced program revenue used to fund PhD students in Business. Program is successful in paying for itself and more, due to sufficient capacity in existing courses. The program is important, given the large demand for professional actuaries. The program shares courses and faculty from the Actuarial Science undergraduate major and graduate programs in Risk and Insurance.

The program is making revenue each year. The capstone estimates it has made $967,742.88 gross revenue and $621,575.77 net revenue since its inception in Fall 2011. Because the certificate program requires only existing courses, there are no incremental instructional program costs. Other expenses include (1) the salary and fringe benefits for the Program Director, and 10% of an administrative staff member for assistance; (2) services and supplies; (3) scholarships/financial assistance (PhD student support).
Recommendation for Future Directions

Based on the program review committee’s comments, the program would benefit to improve upon several areas. First, the program could market the program more aggressively. Second, the program should enhance recruitment of women and domestic targeted minorities, possibly through use of program revenue to fund scholarships. Third, the program needs to create an official dated student handbook in PDF form. Finally, the program needs to create and implement an assessment plan for its five stated learning goals to meet Graduate School requirements.

Follow Up

Program Faculty Director Margie Rosenberg and Director Gordon Enderle are working on the recommendations above. Specifically, they are working on creating a stronger advertising program, on and off campus, and are enhancing recruitment of women and domestic targeted minority students, with a goal of eventually using program revenue for scholarships. They plan to complete a formal student handbook in PDF form by the end of this academic year and create a learning goals assessment plan by the end of this academic year).

The program directors have reviewed their implementation form and updated it as needed. Specifically, the learning outcomes have been updated and the new faculty program director and primary staff contact are indicated.

Attachments:
Program Review Committee Report
Updated Implementation Form

Copies:
Margie Rosenberg, Faculty Director, Capstone Certificate in Actuarial Science
Gordon Enderle, Director, Capstone Certificate in Actuarial Science
Alex Hanhart, Chair, Program Review Committee
Jocelyn Milner, APIR
Sarah Kuba, APIR
Bill Karpus, Graduate School
Parmesh Ramanathan, Graduate School
Ella Mae Matsumura, Senior Associate Dean of Academic Programs
Nicole Jennings, Associate Dean for Academic Affairs and Administration
Wisconsin School of Business  
University of Wisconsin-Madison

Program Review Report  
Capstone Certificate in Actuarial Science

May 2017

Introduction
Dean François Ortalo-Magné charged the committee to complete the first five-year review of the Capstone Certificate in Actuarial Science. The analysis and report were prepared Alex Hanhart (Mathematics) who served as chair of the committee. Kristin Eschenfelder (Information School) represented the Graduate Faculty Executive Committee (GFEC) on the committee. Yazhen Wang (Statistics) served as a committee member. Ruth Lillie (School of Business Dean’s Office) served in an administrative role for the committee and was instrumental in facilitating the program review process.

The committee received the following documents:
- A charge from Dean François Ortalo-Magné
- The self-study prepared by the program faculty and staff
- UW-Madison certificate review guidelines, which also includes an appendix with some advice for the work of the review committee (These guidelines are also available at this link: [http://apir.wisc.edu/uapc/Certificates_Guidelines_4.17.2014_FullPolicy.pdf](http://apir.wisc.edu/uapc/Certificates_Guidelines_4.17.2014_FullPolicy.pdf))
- The original proposal for the Capstone Certificate in Actuarial Science
- Graduate School statistical reports

The committee met three times and collected the following data:
- Meeting with past and current program Directors/Advisors: Margie Rosenberg and Gordon Enderle
- Meeting with one current student
- Qualtrix survey of 4-7 students (not all students answered all questions)
- Email questions to three current program faculty

Response to Charge. In this section, we answer the specific questions put forth in Dean Ortalo-Magné’s charge.

**Question #1: Determine whether the goals and objectives as stated in the original proposal are being met. Evaluate the alignment of the expected standards of quality and the reality of what the certificate is offering.**

The fundamental goal for the Capstone Certificate program in Actuarial Science is to offer a postgraduate "bridge" for those interested in entering the actuary career and assist them in entering the field. The target audience for this program ranges from recent graduates looking for career preparation to working professionals interested in a career change. The program is built upon existing undergraduate and graduate level courses offered by the Risk and Insurance department whose content is associated
with professional exams necessary for employment in the actuarial field. Originally the program stated a goal of producing sufficient revenue to support additional faculty lines and/or an associated instructor.

The program has been successful thus far in producing employable students. As of Spring 2016, 45 out of 58 students moved into a career associated with the actuarial profession or moved into a post-graduate program. Of the 13 remaining students, 5 were neither employed in the actuarial field nor in graduate school, and we have no data on 8 graduates.

The program is not as large as initially planned. The certificate has had an average of 15.5 students per year and awards an average of 7.4 certificates per year. This has not been sufficient to hire new faculty, but it has produced program revenue used to fund PhD students in Business. Program is successful in paying for itself and more (see #3 below)

Program faculty have taken action to ensure program quality. Entry requirements were increased to ensure entering students were adequately prepared. For example, the program now also encourages students to pass “Exam P” before admission to program if they do not have sufficient recent math coursework. This ensures they will be well prepared for the program and allows them to be more competitive in the fall career fair.

The program has good completion metrics. Further, some students who do not complete the certificate do so because they are able to obtain full time actuarial positions prior to program completion. The program encourages successful actuarial exam passage by counseling students about exam timing and by reimbursing students for the cost of taking exams if the student passes the exam.

A survey of current and former students suggest that overall student satisfaction in the program is good. All surveyed students agreed that they could enroll for the classes they need (100%). Four of 5 students surveyed felt the courses helped them obtain their career objectives and 4 of 5 indicated they received sufficient guidance about courses and program requirements.

Question #2: **Confirm that the program is important for delivery at UW-Madison and understand the program’s relationship to other programs at UW-Madison. Are other programs affected either positively or negatively? Have connections with other programs, as planned in the original proposal, developed as envisioned?**

The program is important. There is a very large demand for professional actuaries and those employed in the field often receive comfortable compensation. Overall interest in the field as a profession has continued in recent years as evident by the over three-fold increase in the student population of the associated undergraduate program since the early 2000s.

The program shares courses and faculty with the Actuarial Science undergraduate major and graduate programs in Risk and Insurance.

Opportunities exist to create relationships with other programs (math, stats, engineering, health policy) especially in recruiting junior and senior undergraduates who might be interested in pursuing the certificate after completion of their bachelor’s degree.

Question #3: **Determine if the resource implications of continuing the program are appropriate.**

The program is making revenue each year. The capstone estimates it has made $967,742.88 gross revenue and $621,575.77 net revenue since inception. Because the certificate program requires only existing courses, there are no instructional program costs. Expenses include:

- the salary and fringe benefits for the Program Director, 10% of an administrative staff member for assistance.
- services & supplies.
- scholarships/financial Assistance (@ $21,000.00 to PhD student support).
Question #4:  Offer the program faculty and/or the dean any advice for program improvement and summarize any actions for follow-up or attention.

Advertising: The program has not aggressively advertised itself either on or off campus. The committee recommends that the program create marketing materials aimed at juniors and seniors in related departments (e.g., math) who may be interested in a career in actuarial science. The committee also recommends that the program work with Division of Continuing Studies to create and implement a regional marketing plan (most students commute regionally).

Recruitment of students of color and women: The program currently has 11% targeted domestic minority students and 35% of students are women. Comparatively, the undergraduate actuarial science major is 6.5% domestic targeted minority students and the undergraduate Business School population is 37% women. Certificate advisors described an effort to raise scholarships from companies to support certificate recruitment, but the review committee also recommend strategic use of program revenue to enhance recruitment of women and domestic targeted minorities into the certificate.

To comply with Graduate School expectations, the program needs to create a formal dated student handbook in PDF form. The program has 5 stated learning goals, but needs to create and implement an assessment plan based on those learning goals to meet Graduate School requirements.

Question #5: Provide an explicit recommendation as to whether or not the program should continue.

The review committee recommends that the program continue and expand.
Implementation Form – Capstone Certificates

This form must accompany a capstone certificate proposal. An updated form should be submitted when changes to the certificate are made and when a certificate is reviewed. It is used by administrative offices to better assist departments and programs with implementation. Questions in this form reflect guidelines in the Full Guidelines for For-Credit Certificates, [https://apir.wisc.edu/academic-planning/certificates/](https://apir.wisc.edu/academic-planning/certificates/)

Document Date: 3-28-18
Name of Capstone Certificate: Actuarial Science
Faculty Program Director: Margie Rosenberg (margie.rosenberg@wisc.edu; 262-1683)
Primary Faculty/Staff Contact: Gordon Enderle (genderle@wisc.edu; 262-5800)
Home Department/Academic Unit (Name/UDDS): Risk and Insurance/A1232
  Approval Date: October 2010
School/College: Business
  Approval Date: November 2010
GFEC Approval Date: 12-10-10
UAPC Approval Date: 12-16-10
Implementation Term (typically the fall term after UAPC approval): Fall 2011
Year that first program review is scheduled (usually 5 years after implementation) or year most recent program review completed: 2016-17

Information to be completed by APIR:
Plan Code: UNCS009
CIP Code: 52.1304
CDR Certificate Level Code: 6
Primary Divisional Disciplinary Assignment: S

Curriculum (9-12cr) - List of required and elective courses and any other program requirements:

<table>
<thead>
<tr>
<th>Required Classes</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT SCI/MATH 303</td>
<td>Theory of Interest and Life Insurance</td>
</tr>
<tr>
<td>ACT SCI 650</td>
<td>Actuarial Mathematics I</td>
</tr>
<tr>
<td>ACT SCI 652</td>
<td>Loss Models I</td>
</tr>
</tbody>
</table>

Specialization Core

Choose at least one of:

<table>
<thead>
<tr>
<th>Required Classes</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT SCI 651</td>
<td>Actuarial Mathematics II</td>
</tr>
<tr>
<td>ACT SCI 653</td>
<td>Loss Models II</td>
</tr>
</tbody>
</table>
Choose at least one of:

<table>
<thead>
<tr>
<th>ACT SCI 654</th>
<th>Regression and Time Series for Actuaries</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT SCI 655</td>
<td>Health Analytics</td>
<td></td>
</tr>
</tbody>
</table>

**Learning Goals:**

List 1 to 5 certificate learning goals:

1. Recognize and explain the concept of risk, and apply the knowledge to the development of insurance products that are used to manage risk for the consumer as well as the risk of those products on the insurance organization.

2. Describe the actuarial profession, including the major professional organizations, the professional obligations of being an actuary, and the requirements to obtain and maintain a professional actuarial designation.

3. Demonstrate skills in critical thinking, quantitative analysis, and communication, as well as to develop an appreciation for actuarial theory, research, and the link to practical application.

4. Demonstrate the soft skills of being a professional.

5. Communicate their experiences and inspire others across the WSOB learning community.

**Projections for annual enrollment:** The Capstone program has 6 students in Spring 2018. We anticipate a Fall 2018 student body of 5 to 10 students and hope to grow to 20 students per semester over the next 5 years. We plan to maintain the high level of student quality as currently in our undergraduate program for admission criteria for the Capstone Certification program students.

Specify overlap provisions – name degree/major, minor or certificate programs that a student may have previously earned that disqualify them from being admitted to the capstone certificate program.

<table>
<thead>
<tr>
<th>Please answer the following:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confirm that the capstone certificate is open to only non-degree seeking University Special students who hold a bachelor’s degree.</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Confirm that all credits are required to be earned in residence at UW-Madison.</td>
<td>x</td>
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</tr>
<tr>
<td>Will there be limits on number of students who can enroll?</td>
<td>x</td>
<td></td>
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<tr>
<td>If Yes, please explain:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confirm that all core/required courses are approved through the school/college curriculum committee.</td>
<td>x</td>
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</tr>
<tr>
<td>Confirm that courses in curriculum are offered on a regular basis and have space for students in this program.</td>
<td>x</td>
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<tr>
<td>Confirm that required courses in the curriculum are numbered 300 or above.</td>
<td>x</td>
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<tr>
<td>Confirm that courses taken as Pass/Fail or Audit are <em>not</em> included in the curriculum.</td>
<td>x</td>
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<tr>
<td>Question</td>
<td>Yes/No</td>
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<td>------------------------------------------------------------------------</td>
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<tr>
<td>Are courses taken Credit/No Credit allowed?</td>
<td>x</td>
<td></td>
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<tr>
<td>If yes, specify limits:</td>
<td></td>
<td></td>
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<tr>
<td>Confirm that special topics courses are only used if all instances count for the certificate.</td>
<td>x</td>
<td></td>
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<tr>
<td>Confirm that, at a minimum, C grades must be earned on all course work attempted for the capstone certificate program. (Only graduate-level work from the capstone that is earned with a grade of B or better is eligible for subsequent application to a UW-Madison graduate degree program.)</td>
<td>x</td>
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<tr>
<td>If other requirements, please specify:</td>
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<tr>
<td>Will exceptions to the course core requirements be allowed?</td>
<td>x</td>
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<tr>
<td>If yes, specify limits and process: Exceptions will be determined on an individual basis and are most likely in cases where a student has demonstrated their knowledge of a particular subject through other coursework or passing the associated professional exam. We will substitute other appropriate courses as necessary.</td>
<td></td>
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<tr>
<td>In all cases, the courses considered as potential substitutions are 300 level and higher. The exceptions will not diminish the level of the coursework completed to obtain a certificate.</td>
<td></td>
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</tr>
<tr>
<td>Confirm that the program/department has a process in place to monitor student progress and to notify the Registrar’s Office when students complete the certificate requirements.</td>
<td>x</td>
<td></td>
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<tr>
<td>The current process is manual, using records entered in spreadsheets resulting from one-on-one discussions with students on their progress during advising sessions. The program is still small enough that this manual approach is feasible. As the program grows, the manual process will become more cumbersome to administer, which is why coding the Capstone curriculum requirements into DARS as the framework for tracking student progress will be beneficial.</td>
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<tr>
<td>Assessment plan – confirm that the proposal includes a plan that describes how the program faculty will regularly evaluate student learning.</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Confirm that the program/department understands that international students who must request a UW-Madison-issued I-20 (for the F-1 student visa needed for legal study in the US) will only be eligible to participate in the program if it is offered full-time and if the program has been approved by the US government to receive such international students. If the program is offered entirely online or the international student is here legally on another visa (such as the JS, H, etc.) and an I-20 from UW-Madison is not needed, then this provision does not apply.</td>
<td>x</td>
<td></td>
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<tr>
<td>Will this capstone certificate be implemented as a Fund 131 tuition program?</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>If yes, has a budget been developed with the Division of Continuing Studies and the sponsoring school/college dean’s office?</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>
Who is the appropriate school/college contact for questions? Ella Mae Matsumura
Certificates and Doctoral Minors: Counts

Select Data Recency
Census date used for official count...

Select Time Period
10 years

Credential Type
All

Credential Name
Capstone Certificate in Actuarial...

Capstone Certificate

This visualization was created by Academic Planning and Institutional Research (APIR), Office of the Provost, UW-Madison. Visit http://apir.wisc.edu for more information about APIR. Questions should be directed to McKinney Austin, mckinney.austin@wisc.edu.
Headcounts of Certificate-Seeking Students

Select Term
Spring

Select Time Period
All available (to spring 2008)

Select Topic
Academic Level

Student Academic Level
All

Student Term Admit Type
All

Student School/College
All

Type of Certificate
Capstone Certificate

Disciplinary Division of Cert.
All

School/College of Certificate
All

Department of Certificate
All

Certificate
Capstone Certificate in Actuarial ...

Special

2012: 8 (100.0%)
2013: 19 (100.0%)
2014: 17 (100.0%)
2015: 13 (100.0%)
2016: 12 (100.0%)
2017: 6 (100.0%)
2018: 5 (100.0%)

This visualization was created by Academic Planning and Institutional Research (APIR), Office of the Provost, UW-Madison. Visit [http://apir.wisc.edu](http://apir.wisc.edu) for more information about APIR. Questions should be directed to McKinney Austin, mckinney.austin@wisc.edu [Click here to provide feedback on this visualization](http://apir.wisc.edu).