Central Washington University
Assessment of Student Learning
Department and Program Report

Please enter the appropriate information concerning your student learning assessment activities for this year.

**Academic Year of Report:** 2014/15  
**College:** COTS  
**Department:** Mathematics  
**Program:** Actuarial Science, Mathematics

1. **What student learning outcomes were assessed this year, and why?**  
   In answering this question, please identify the specific student learning outcomes you assessed this year, reasons for assessing these outcomes, with the outcomes written in clear, measurable terms, and note how the outcomes are linked to department, college and university mission and goals.

   The first 5 of the Student Learning Outcomes (attached) were assessed. We chose these because they had similar Criterion of Achievement, and because earlier assessments indicated some issues in these areas.

2. **How were they assessed?**  
   In answering these questions, please concisely describe the specific methods used in assessing student learning. Please also specify the population assessed, when the assessment took place, and the standard of mastery (criterion) against which you will compare your assessment results. If appropriate, please list survey or questionnaire response rate from total population.

   **A) What methods were used?**  
   For the Outcomes with a Grade-based Criterion of Achievement, data from Safari was obtained. Additionally, we were able to collect data relating to the number of Society of Actuaries’ exams passed from the advisors.

   **B) Who was assessed?**  
   We assessed Actuarial Science majors who graduated during the 2013-14 academic year.

   **C) When was it assessed?**  
   Fall Quarter, 2013; Winter Quarter, 2014; Spring Quarter 2014; some classes may have been taken earlier in students’ careers.

3. **What was learned?**  
   In answering this question, please report results in specific qualitative or quantitative terms, with the results linked to the outcomes you assessed, and compared to the standard of mastery (criterion) you noted above. Please also include a concise interpretation or analysis of the results.

   For this group of students, our goals for all of Student Learner Outcomes #1, 2, 3, 4, and 5 were met (anecdotally, this was a very strong group of students). The actuarial science program
is primarily a pre-professional program for future actuaries. Actuaries take a rigorous series of credentialing exams set by the main professional organizations (the Society of Actuaries is the largest of these). We encourage students who are pursuing exam-track actuarial careers to pass as many exams as possible before graduation, with a goal of 1-2 exams passed. For the cohort that graduated in 2013-14, 66.7% of the students had passed at least one exam and 55.6% had passed at least two before graduation. These are well above the national averages and we are quite proud of this group of students. As our coursework is directly related to preparing students for these exams, these passing rates provide another measure of how well our students are meeting the SLOs.

Our major focus in terms of assessment for the next couple of years is the new requirement from general education that all programs assess writing in the major. To be able to assess student writing, we will be implementing a senior seminar and a portfolio requirement. This portfolio will contain examples of various forms of writing that are common in the actuarial profession, and will enable us to more directly assess SLOs #7 and 8. In addition, students will be required to make presentations, enabling a more direct assessment of SLO #9.

4. **What will the department or program do as a result of that information?**
In answering this question, please note specific changes to your program as they affect student learning, and as they are related to results from the assessment process. If no changes are planned, please describe why no changes are needed. In addition, how will the department report the results and changes to internal and external constituents (e.g., advisory groups, newsletters, forums, etc.).

As mentioned above, we will be implementing a senior seminar (probably first offered in 2016-17). This seminar will enable us to gather more information about our graduating seniors and whether they are meeting the SLOs of the program.

5. **What did the department or program do in response to last year’s assessment information?**
In answering this question, please describe any changes that have been made to improve student learning based on previous assessment results. Please also discuss any changes you have made to your assessment plan or assessment methods.

Last year’s assessment was discussed meetings among the actuarial science faculty. Some changes were made in senior-level courses to better align them with SOA requirements.

6. **Questions or suggestions concerning Assessment of Student Learning at Central Washington University:**
Many Student Learning Outcomes for this program are assessed through Course Grades and Surveys.

For Course Grade based assessment, the Criterion of Achievement is “80% of students pass course with a B or better on 1st or 2nd attempt” referred to as “Grade Criterion” in the table below.

For Survey based assessment, the Criterion of Achievement is a response rate of 80% and that 80% of student responses are either Strongly Agree or Agree with the statements in the survey. This is referred to as “Survey Criterion” in the table below.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Method(s) of Assessment</th>
<th>Who Assessed?</th>
<th>When Assessed?</th>
<th>Criterion of Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Graduates will be able to use statistical methods to analyze and model time-independent and time-series data.</td>
<td>Course Grade</td>
<td>Students in MATH 311, 410AB, 411BC</td>
<td>Quarterly</td>
<td>Grade Criterion 81.5% of the students earned a B or better on 1st or 2nd attempt.</td>
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<td>2. Graduates will be able to use statistical methods and credibility theory to analyze and model insurance loss data.</td>
<td>Course Grade</td>
<td>Students in MATH 417ABC</td>
<td>Quarterly</td>
<td>Grade Criterion 96.3% of the students earned a B or better on 1st or 2nd attempt.</td>
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<td>3. Graduates will be able to formulate actuarial problems in mathematics, probabilistic and statistical terms.</td>
<td>Course Grade</td>
<td>Students in MATH 417ABC, 418AB, 419ABC</td>
<td>Quarterly</td>
<td>Grade Criterion 88.9% of the students earned a B or better on 1st or 2nd attempt.</td>
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<td>4. Graduates will be able to apply common probability distributions to actuarial applications.</td>
<td>Course Grade</td>
<td>Students in MATH 411AB, 417ABC, 419ABC</td>
<td>Quarterly</td>
<td>Grade Criterion 87.0% of the students earned a B or better on 1st or 2nd attempt.</td>
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<td>5. Graduates will be able to apply concepts of differential and integral calculus to actuarial problems.</td>
<td>Course Grade</td>
<td>Students in 411AB, 418AB, 417ABC, 419ABC</td>
<td>Quarterly</td>
<td>Grade Criterion 85.2% of the students earned a B or better on 1st or 2nd attempt.</td>
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<td>6. Graduates will be able to employ simulation techniques to analyze and solve dynamic and complex stochastic and mathematical models</td>
<td>Internship Survey and Post-Graduation Survey</td>
<td>Students on Internships and Graduates</td>
<td>Fall, Winter</td>
<td>Survey Criterion</td>
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<td>7. Graduates will be able to use programming languages such as C++, S, or Visual Basic</td>
<td>Internship Survey, Senior Survey and Post-Graduation Survey</td>
<td>Students on Internships, Seniors, and Graduates</td>
<td>Fall, Winter</td>
<td>Survey Criterion</td>
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<td>8. Graduates will be able to communicate results and solutions of mathematical, statistical, and actuarial problems in writing using everyday and mathematical language.</td>
<td>Internship Survey, Senior Survey and Post-Graduation Survey</td>
<td>Students on Internships, Seniors, and Graduates</td>
<td>Fall, Winter</td>
<td>Survey Criterion</td>
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<td>9. Graduates will be able to communicate mathematical and statistical solutions orally, using both everyday and mathematical language.</td>
<td>Internship Survey, Senior Survey and Post-Graduation Survey</td>
<td>Students on Internships, Seniors, and Graduates</td>
<td>Fall, Winter</td>
<td>Survey Criterion</td>
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