

# ANNUAL PROGRAM ASSESSMENT REPORT

(For AY 2013-2014 through 2018-2019)

## CURRENT YEAR - AY 2016-2017 (Year 4)

UNIT	COLLEGE OF ARTS AND SCIENCES
Department (if applicable)	MATHEMATICS & STATISTICS
Degree/Program	Bachelor of Arts / Actuarial Science
Prepared By:	
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Annually, complete a separate report for each academic program (major, minor) at each level (undergraduate, graduate) in your department. Reports are to be sent electronically to [assessment@washburn.edu](mailto:assessment@washburn.edu) by **June 30** each year.

Use size 10 font.

## SECTION I

### 2016-2017 Academic Year

Describe your program's assessment accomplishments since your last report. *Cell will expand to accommodate your text.*

The Mathematics Department assessed our PSLOs with assignments in several courses. The Department also conducted exit interviews with its graduating students.

At a fall department meeting, the Department discussed our assessment plan and results. The 2015-2016 assessment report, collected data from 2015-2016, and feedback from the Assessment Committee were made available to the faculty. The faculty discussed the report and the Assessment Committee's feedback. The Mathematics Department was satisfied with last year's assessment activities. Thus, no changes have been made to our assessment practices.

The Department made a minor change to its Actuarial Track Program. MA 250 Theory of Interest is now MA 384 Theory of Interest. There was no change in the content of the course, but the higher number more accurately depicts the academic rigor of the course and is in line with numbering systems at other institutions. The Assessment Plan has been modified to indicate this change.

The Department has taken steps to encourage our students to start the Society of Actuaries (SOA) Exam series earlier. This was suggested at last year's Actuary Advisory Board meeting. In 2016-2017, three students attempted two different SOA exams. In the past, most students attempted only one exam before graduating.

Discuss ways in which you have responded to the Assessment Committee comments on last year's report and what assessment work was initiated, continued, or completed. *Cell will expand to accommodate your text.*

In last year's report, the Department received "Target" ratings in all categories. Due to the high ratings, the Department made no changes to our assessment practices.

Have there been any changes to your Program Assessment Plan (including calendar and curriculum map) since last year's report? *Cell will expand to accommodate your text.*

Yes (describe what and why below)  No

The course numbering change of MA 250 to MA 384 has been made to the Assessment Plan.

### 2015-2016 Academic Year

Describe your program's assessment accomplishments since your last report. *Cell will expand to accommodate your text.*

The Mathematics Department assessed our PSLOs with several assignments in a variety of courses. The Department also conducted exit interviews with its graduating students.

At a fall department meeting, the Department discussed our assessment plan and results. The 2014-2015 assessment report, collected data from 2014-2015, and subsequent feedback from the Assessment Committee were made available to the faculty. The faculty discussed the report and the Assessment Committee's feedback. The Mathematics Department was generally satisfied with last year's assessment activities. Thus, little changes have been made to our assessment practices.

In response to last year's feedback from the Assessment Committee, the department has made adjustments to our Assessment Plan.

Discuss ways in which you have responded to the Assessment Committee comments on last year's report and what assessment work was initiated, continued, or completed. *Cell will expand to accommodate your text.*

In last year's report, we were at "Target" in all but two categories.

Under "Threshold of Student Success", we received a "Developing" rating. The Committee's report indicated "No thresholds indicated in Plan for Exit Surveys, however, it is listed in the report." We have updated our plan to address this.

Under "Stakeholder Involvement", we also received a "Developing" rating. The Committee's comments were "Only faculty involvement stated in Plan. No mention of student engagement in the Plan, or involvement of stakeholders outside the department or in the community." The Department believes it now has a better understanding of what the Assessment Committee is looking for in this category. The Department has regular activities that we believe should have been included in this area. We have updated our Plan to include these activities.

Have there been any changes to your Program Assessment Plan (including calendar and curriculum map) since last year's report? *Cell will expand to accommodate your test*

Yes (describe what and why below)  No

Our Plan was updated to reflect the changes as described above. The Plan was also adjusted to reflect a change in course number from MA 153 to MA 253.

### 2014-2015 Academic Year

Describe your program's assessment accomplishments since your last report. *Cell will expand to accommodate your text.*

The Mathematics Department assessed our PSLOs with several assignments in a variety of courses. The Department also conducted exit interviews with its graduating students.

At a fall department meeting, the Department discussed our assessment plan and results. The 2013-2014 assessment report, collected data from 2013-2014, and subsequent feedback from the Assessment Committee were made available to the faculty. The faculty discussed the report and the Assessment Committee's feedback. The Mathematics Department was generally satisfied with last year's assessment activities. Thus, little changes have been made to our assessment practices.

This fall the faculty began incorporating the PSLOs in their syllabus along with the assessment measures used in the respective class. Faculty were asked to clearly indicate to students which assignments would be used for assessment. At the end of each term, faculty submitted their course assessment reports and subsequent data to the assessment liaison.

The anonymous portion of the exit interview questions were re-worded to reflect the PSLOs. Several faculty participated in the exit interview process.

Discuss ways in which you have responded to the Assessment Committee comments on last year's report and what assessment work was initiated, continued, or completed. *Cell will expand to accommodate your text.*

In last year's report, we were at "Target" in all but two categories.

Under "Threshold of Student Success", the Committee's report indicated "Threshold not stated for Indirect Assessment indicated for each PSLO on Assessment Plan". We have added thresholds under each PSLO for our indirect measure of exit interviews.

Under "Stakeholder Involvement", we received a "Beginning" rating. There were no comments made for this category so we were not exactly sure what we should do to address this. Part of our lower rating may be due to a lack of understanding on what to report for this category. The Department organizes an Actuarial Advisory Board which meets annually. This information had not been previously reported, but is included in this year's report. Dr. Mosier has also been in contact with area employers who provide internships for our students. This information was also not previously reported but is now included in this report. Additionally, the Mathematics faculty have always monitored recommendations by the American Statistical Association and the Society of Actuaries and make curriculum changes when necessary. Faculty members also attend and/or present at conferences to stay aware of current national standards and practices.

The department did make some changes to address the Stakeholder issue. We reworded some questions on our exit interviews to better reflect our PSLOs. Approximately every five years the Department sends out an alumni survey. The next time this survey is sent, we will attempt to rewrite the questions to also reflect our PSLOs. These changes mean that the stakeholders of our exiting seniors and alumni will now play a larger role in the development and continuous improvement of the Assessment Plan. The Department also began incorporating PSLOs on syllabi.

Have there been any changes to your Program Assessment Plan (including calendar and curriculum map) since last year's report? Cell will expand to accommodate your test

Yes (describe what and why below)  No

Questions on the anonymous portion of our exit interviews were reworded to reflect the PSLOs. We have also added thresholds for our exit interviews. Finally, the data collection calendar was adjusted to every other year, since this reflects course rotation for the majority of our upper level courses.

### 2013-2014 Academic Year

Describe your program's assessment accomplishments since your last report. *Cell will expand to accommodate your text.*

For the 2013-2014 year, the Mathematics department collected data on class grades in the major, assessment assignments in Calculus I, exit interview responses, and final exam data. Results were consistent with departmental expectations.

The Mathematics Department held a meeting in Fall 2013 to discuss and review the departmental assessment plan. Copies of the 2012-2013 assessment report and collected data were made available to all faculty. The Assessment Committee's feedback on our annual assessment report and subsequent ratings were distributed to department faculty and discussed.

In Spring 2014, a Departmental Committee was formed to examine the Program plan and make suggestions for change. These changes are described in the respective field below.

As with the 2012-2013 year, faculty who taught a course in the Program completed the relevant portions of this document on their own. The liaison then merged information from all instructors to create this report.

Discuss ways in which you have responded to the Assessment Committee comments on last year's report and what assessment work was initiated, continued, or completed. *Cell will expand to accommodate your text.*

In last year's report, the Department received rankings of "Advanced" or "Target" in all but one category. The category of "Communication with Students" has been one that the Department has regularly struggled with. The comment for this category on last year's report was: "It is clear that you share accomplishments but not the data driven changes".

We continue to publicize to our current students and alumni our student accomplishments, including our success rates on the Society of Actuary Exams and Kappa Mu Epsilon Conference presentations/awards. The Program assessment results have been within our desired range so there have been no "data driven changes" in recent years.

The Department acknowledges that we have not clearly communicated to our students our PSLOs and how we measure them. Starting in Fall 2014, instructors of courses in the Program will be asked to incorporate the respective PSLO(s) that their course addresses on the syllabus. Additionally, instructors will be asked to clearly indicate to students which projects/assignments will be used for assessment reporting and to distribute the departmental grading rubric to students.

Have there been any changes to your Program Assessment Plan (including calendar and curriculum map) since last year's report?

Yes (describe what and why below)  No

Since it had been several years since any significant changes were made to the Program Assessment Plan, a departmental committee was formed in Spring 2014 to examine the Program Assessment. The committee suggested several changes, which were voted on and approved by the Department. The previous plan contained six PSLOs which were worded to fit all three tracks for Mathematics majors. The new plan has four SLOs which target specific outcomes of the Actuarial track. Additionally, faculty members who regularly teach courses for this Program committed to specific assignments/projects which will be used for assessment. Our previous plan used results from the Society of Actuary exams as an assessment measure. While all students in this Program are encouraged to take at least one SOA exam before graduating, it is not a requirement. Also, results from SOA exams are obtained by students self-reporting their scores. Because of this, the department voted to remove SOA results as an assessment measure. The department will continue to encourage students to take SOA exams and will continue to publicize success on the exams to our current students and alumni.

## SECTION II

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2016-2017 Academic Year			
<b>Program Student Learning Outcomes Analyzed and</b>	List the Assessment Measure(s) for each PSLO – if rubrics are used, a copy of each should be in your department's assessment subfolder on the shared drive	Describe the results for PSLOs analyzed (assessed) <b>this</b> year – a copy of summary data should be in your department's assessment subfolder on the shared drive	Describe how results are <b>shared</b> with <b>faculty, students, university-wide entities, and stakeholders</b> (advisory boards, employers, community, alumni, etc.).

<b>Reported for Current Year</b>			
<p><b>PSLO # <u>3</u></b>            Demonstrate the ability to communicate mathematics and statistical results both orally and in writing.</p>	<p><b>Direct:</b></p> <ol style="list-style-type: none"> <li>1) 70% of all students completing courses MA 301, MA 343, MA 346, and MA 348 will obtain a C or better in the course.</li> <li>2) 70% of all students completing MA 301 will have an average of 2.5 (out of 4) on the course communication assignment(s) using the Departmental rubric.</li> <li>3) 70% of all students completing MA 343 will have an average of 2.5 (out of 4) on the course communication assignment(s) using the Departmental rubric.</li> <li>4) 70% of all students completing MA 346 will have an average of 2.5 (out of 4) on the course communication assignment(s) using the Departmental rubric.</li> <li>5) 70% of all students completing MA 348 will have an average of 2.5 (out of 4) on the course communication assignment(s) using the Departmental rubric.</li> </ol>	<ol style="list-style-type: none"> <li>1) For the 2016-2017 year, at least 70% of all students completing courses MA 301 (88%), MA 343 (88%), MA 346 (77%), and MA 348 (100%) earned a C or better in the course.</li> <li>2) Despite repeated requests by the assessment liaison, the MA 301 instructor did not submit assessment information in time to be included in this report.</li> <li>3) For Spring 2017, 100% of participating students in MA 343 had an average of &gt; 2.5 on the communication rubric, and the overall class average was 3.47.</li> <li>4) 88.8% of students in MA 346 had an average of &gt; 2.5 on the communication rubric, and the overall class average was 3.14.</li> <li>5) In MA 348, 100% of students had an average of &gt; 2.5 on the communication rubric, and the overall class average was 3.55.</li> </ol>	<p>The Department's Office Administrator compiles and distributes a grade distribution document to all math faculty. This document shows the percentage of students who received A, B, C, etc. in Mathematics courses.</p> <p>Results of the course assessment assignments are shared with Department faculty on the S-drive. At the Fall Department meeting, the Assessment Liaison reminds Department faculty to look at the S drive for these results. Faculty are free to ask for more detail from the individual course instructors.</p> <p>The syllabi for the respective courses lists the learning outcomes satisfied by the course, the assessment measures for the course, and aggregate data from recent semesters indicating whether or not the outcome was previously satisfied.</p> <p>The Department has organized an Actuarial Advisory Board comprised of area employers and Washburn Alumni. The Board does not receive specific information on our assessment assignments, but it is made aware of curriculum practices regarding the courses we offer and the course content.</p> <p>All full-time Mathematics faculty are invited to conduct exit interviews. Responses from exit interviews are combined into a single document and posted on the S drive in the Mathematics folder. Faculty are made aware that the document is available for them to view. A copy of the document is sent directly to the Department Chair.</p>
	<p><b>Indirect:</b></p> <ol style="list-style-type: none"> <li>1. No more than 20% of the students responding will mention this as a concern during their free-response exit interview.</li> <li>2. 70% of the students responding to the anonymous portion of the exit interview will indicate "Good", "Very Good", or "Excellent" on questions related to this PSLO.</li> </ol>	<ol style="list-style-type: none"> <li>1. Five graduating seniors participated in the free-response exit interviews during 2016-2017. The comments on the free-response portion of the exit interviews pertaining to this SLO were positive by 100% of the students.</li> <li>2. Four students completed the anonymous portion of the exit interviews in 2016-2017. 100% of these students gave a rating of "Good", "Very Good", or "Excellent" on questions related to this PSLO.</li> </ol>	

<p><b>PSLO # <u>4</u></b>          Demonstrate the ability to identify and utilize the appropriate practices and tools, including the use of technology, to solve mathematics problems and perform statistical modeling and analysis of data.</p>	<p><b>Direct:</b></p> <ol style="list-style-type: none"> <li>1. 70% of all students completing courses MA 253, MA 301, MA 343, MA 346, MA 348, and MA 385 will obtain a C or better in the course.</li> <li>2. 70% of all students completing MA 253 will obtain an average of 2.5 (out of 4) on course project(s) using the Departmental rubric.</li> <li>3. 70% of all students completing MA 301 will have an average of 2.5 (out of 4) on the course project(s) using the Departmental rubric.</li> <li>4. 70% of all students completing MA 343 will have an average of 2.5 (out of 4) on the course project(s) using the Departmental rubric.</li> <li>5. 70% of all students completing MA 346 will have an average of 2.5 (out of 4) on the course project(s) using the Departmental rubric.</li> <li>6. 70% of all students completing MA 348 will have an average of 2.5 (out of 4) on the course project(s) using the Departmental rubric.</li> </ol>	<ol style="list-style-type: none"> <li>1. For the 2016-2017 year, at least 70% of all students completing courses MA 253 (84.4%), MA 301 (88%), MA 343 (88%), MA 346 (77%), MA 348 (100%), and MA 385 (88%) earned a C or better in the course.</li> <li>2. For MA 253, in Spring 2017, three projects requiring use of the computer algebra system Maple were assessed according to the 4-point departmental rubric, then those scores were averaged. 13 out of 17 students (76.5%) obtained an average of 2.5 or higher, meeting the objective. Despite repeated requests by the assessment liaison, the Fall 2017 MA 253 instructor did not submit assessment information in time to be included in this report.</li> <li>3. Despite repeated requests by the assessment liaison, the MA 301 instructor did not submit assessment information in time to be included in this report.</li> <li>4. In spring 2017, 95% of students in MA 343 had an average of &gt; 2.5 on the ability to perform statistical modeling rubric, and the overall class average was 3.28.</li> <li>5. For MA 346, 100% of students had an average of &gt; 2.5 on the ability to perform statistical modeling rubric, and the overall class average was 3.53.</li> <li>6. For MA 348, 100% of students had an average of &gt; 2.5 on the ability to perform statistical</li> </ol>	<p>The Department's Office Administrator compiles and distributes a grade distribution document to all math faculty. This document shows the percentage of students who received A, B, C, etc. in Mathematics courses.</p> <p>Results of the course assessment assignments are shared with Department faculty on the S-drive. At the Fall Department meeting, the Assessment Liaison reminds Department faculty to look at the S drive for these results. Faculty are free to ask for more detail from the individual course instructors.</p> <p>The syllabi for the respective courses lists the learning outcomes satisfied by the course, the assessment measures for the course, and aggregate data from recent semesters indicating whether or not the outcome was previously satisfied.</p> <p>The Department has organized an Actuarial Advisory Board comprised of area employers and Washburn Alumni. The Board does not receive specific information on our assessment assignments, but it is made aware of curriculum practices regarding the courses we offer and the course content.</p> <p>All full-time Mathematics faculty are invited to conduct exit interviews. Responses from exit interviews are combined into a single document and posted on the S drive in the Mathematics folder. Faculty are made aware that the document is available for them to view. A copy of the document is sent directly to the Department Chair.</p>
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		modeling rubric, and the overall class average was 3.45.	
	<p><b>Indirect:</b></p> <ol style="list-style-type: none"> <li>1. No more than 20% of the students responding will mention this as a concern during their free-response exit interview.</li> <li>2. 70% of the students responding to the anonymous portion of the exit interview will indicate “Good”, “Very Good”, or “Excellent” on questions related to this PSLO.</li> </ol>	<ol style="list-style-type: none"> <li>1. Five graduating seniors participated in the free-response exit interviews during 2016-2017. The comments on the free-response portion of the exit interviews regarding this PSLO were generally positive by 100% of the students. The only non-positive comment was a suggestion for the Department to encourage students to earn a BS with a minor in CIS as opposed to the BA option for the Actuary Track.</li> <li>2. Four students completed the anonymous portion of the exit interviews in 2014-2015. 100% of these students gave a rating of “Good”, “Very Good”, or “Excellent” on questions related to this PSLO.</li> </ol>	

**Discuss the implications of the results reported above and how faculty members are involved in using assessment data to improve student learning.**

Many of our Program courses are taught by the same instructor each time the course is offered. These instructors use results to make any necessary changes to their course(s).

Assessment data for courses that are taught by multiple faculty are shared with the respective faculty. These faculty then discuss results together and decide what, if any changes, should be made.

Faculty who teach a prerequisite course to another Program course share assessment data with the instructor(s) of the subsequent course(s). This gives the faculty of the subsequent course(s) the opportunity to make any necessary adjustments.

Assessment data is posted on the S drive for any interested math faculty member to review.

Our assessment data is consistent with our desired results so no major changes have been made.

**Describe how students and external stakeholders (advisory boards, employers, community, alumni, etc.) are made aware of PSLOs and measures.**

Course syllabi list the PSLOs, the measures used to assess them, and aggregate results from previous semesters indicating if the measures have been satisfied. Faculty also are asked to indicate to students which specific assignments are addressing PSLOs.

The department organizes an Actuarial Advisory Board which meets once a year. This Board is comprised of practicing actuaries from Topeka, Kansas City, and Wichita. About half of the Board members are Washburn graduates and the other half are potential employers. The Board discusses the current professional credentialing exam sequence, our curriculum, and what employers are looking for when hiring new graduates.

We currently have about 5 students placed in internships in Topeka companies. Dr. Mosier is in regular contact with these employers and receives feedback on what preparation they want our students to have. This information is used to adjust our curriculum if needed.

The exit interviews give students the opportunity to voice concerns and/or offer suggestions for changes to the Program. Each student is interviewed separately by two different Mathematics faculty members. Several math faculty participate in the interview process. The overall results are compiled into a single file and placed on the S drive for all Mathematics faculty to view. In the past, Program changes have been made due to concerns/suggestions given in exit interviews. In the 2016-2017 year, students made two suggestions regarding the Actuary Track. One comment suggested that the Department encourage our students in the Actuary Track to pursue a BS (specifically with a minor in Computer Information Sciences) rather than a BA degree. The other comment indicated that some of the Business courses required for the major were not helpful and that the Mathematics Department should consider either dropping these courses as a requirement or replacing them with other Business courses.

The exit interview contains an anonymous portion. Questions on the anonymous portion reflect the PSLOs.

The Mathematics Department believes that the American Statistical Association and the Society of Actuaries are important stakeholders in our Actuarial Science program. We continue to monitor changes and suggestions made by these organizations. If and when these organizations suggests changes, we will adjust our major accordingly.

**2015-2016 Academic Year**

<b>Program Student Learning Outcomes Analyzed and Reported for Current Year</b>	List the Assessment Measure(s) for each PSLO – if rubrics are used, a copy of each should be in your department’s assessment subfolder on the shared drive	Describe the results for PSLOs analyzed (assessed) <b>this</b> year – a copy of summary data should be in your department’s assessment subfolder on the shared drive	Describe how results are <b>shared</b> with <b>faculty, students, university-wide entities, and stakeholders</b> (advisory boards, employers, community, alumni, etc.)
<p><b>PSLO #1</b> Demonstrate the ability to solve a variety of problems in mathematics including calculus, probability and statistics, and linear algebra.</p>	<p><b>Direct:</b></p> <p>1) 70% of all students completing MA 151 will obtain an average of 2.5 (out of 4) on specified assessment assignments using the Departmental rubric.</p> <p>2) 70% of all students completing the respective courses will obtain a C or better in the course.</p>	<p>1) In Fall 2015, 84.8% (28 out of 33) of students completing MA 151 average at least 2.5 on the assessment homework problems and assessment final exam problems. In Spring 2016, 24 out of 27 (88.9%) average at least a 2.5 on the assessment assignments. This objective was satisfied.</p> <p>2) In 2015-2016, all but one course had at least 70% of all students completing the course earn a C or better. The one exception was the Fall 2015 MA 152 Calculus II course, which had 9/14 or 64% of the students</p>	<p>Results of the MA 151 assessment assignments are shared with Department faculty on the S-drive. At the Fall Department meeting, the Assessment Liaison reminds Department faculty to look at the S drive for results. Faculty are free to ask for more detail from the individual instructor.</p> <p>The syllabi for the respective courses lists the learning outcomes satisfied by the course, the assessment measures for the course, and aggregate data from previous semesters indicating if the outcome was previously satisfied.</p>

		<p>enrolled at the end of the semester earn a C or higher. However, this course had 3/14 or 21% of the class receive a QF, which could be interpreted as these students did not complete the course. In this case, 9/11 or 82% of the students earned a C or better. If one includes the QF students in the data, for the entire 2015-2016 year, 27 out of 37 or 73% of the students completing MA 152 earned a C or better. Thus, the objective is considered to be satisfied.</p>	<p>The Departmental Secretary compiles and distributes a Grade Distribution document to all math faculty. This document shows the percentage of students who received A, B, C, etc. in Mathematics courses.</p> <p>The Actuarial Advisory Board does not receive specific information on our assessment assignments. However, the Board is made aware of curriculum practices regarding the courses we offer and the course content.</p>
	<p><b>Indirect:</b></p> <p>1) No more than 20% of the students responding will mention this as a concern during their free-response exit interview.</p> <p>2) 70% of the students responding to the anonymous portion of the exit interview will indicate “Good”, “Very Good”, or “Excellent” on questions related to this PSLO.</p>	<p>1) During the free-response portion of the exit interview, no student mentioned problem solving abilities as a concern.</p> <p>2) For 2015-2016, 5 students completed the anonymous portion of the exit interview. 100% of the students answered “Good”, “Very Good”, or “Excellent” on the question pertaining to PSLO #1.</p>	<p>All tenured/tenure-track faculty are invited to conduct exit interviews. Responses from exit interviews are combined into a single document and posted on the S drive in the Mathematics folder. Faculty are made aware that the document is available for them to view. A copy of the document is sent directly to the Department Chair.</p>
<p><b>PSLO #2</b> Demonstrate the ability to write mathematical proofs and solve challenging problems both pure and applied.</p>	<p><b>Direct:</b></p> <p>1) 70% of all students completing MA 343 will have an average of 2.5 (out of 4) on projects using the Departmental rubric.</p> <p>2) 70% of all students completing the respective courses will obtain a C or better in the course.</p>	<p>1) 81.8% of students had an average of &gt; 2.5 on challenging applied problems rubric, and the overall class average was 3.23</p> <p>2) In 2015-2016, all courses had at least 70% of all students completing the course earn a C or better.</p>	<p>The Departmental Secretary compiles and distributes a Grade Distribution document to all math faculty. This document shows the percentage of students who received A, B, C, etc. in Mathematics courses.</p> <p>The graded assignments were returned to students in a timely fashion.</p> <p>The summary results regarding PSLO #2 will be provided to all faculty who regularly teach upper level statistics courses. The full results will be shared with all interested faculty, who will be identified through an e-mail request.</p>
	<p><b>Indirect:</b></p> <p>1) No more than 20% of the students responding will mention this as a concern during their free-response exit interview.</p>	<p>1) During the free-response portion of the exit interview, 80% of the students did not mention this as a concern. Only one student (which represents the 20%), indicated that “maybe” they had a gap in their education with “more theoretical stuff”.</p>	<p>The Actuarial Advisory Board does not receive specific information on our assessment assignments. However, the Board is made aware of curriculum practices</p>

	<p>2) 70% of the students responding to the anonymous portion of the exit interview will indicate “Good”, “Very Good”, or “Excellent” on questions related to this PSLO.</p>	<p>2) For 2015-2016, 5 students completed the anonymous portion of the exit interview. There are two questions on the anonymous portion which pertain to this PSLO. On one of the questions, 100% of the students answered “Good”, “Very Good”, or “Excellent”. On the other question, 80% of the students answered “Good”, “Very Good”, or “Excellent”. Thus, the objective was satisfied.</p>	<p>regarding the courses we offer and the course content.</p> <p>All tenured/tenure-track faculty are invited to conduct exit interviews. Responses from exit interviews are combined into a single document and posted on the S drive in the Mathematics folder. Faculty are made aware that the document is available for them to view. A copy of the document is sent directly to the Department Chair.</p>
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**Discuss the implications of the results reported above and how faculty members are involved in using assessment data to improve student learning.**

Many of our Program courses are taught by the same instructor each time the course is offered. These instructors use results to make any necessary changes to their course(s).

Assessment data for courses that are taught by multiple faculty are shared with the respective faculty. These faculty then discuss results together and decide what, if any changes, should be made.

Faculty who teach a prerequisite course to another Program course share assessment data with the instructor(s) of the subsequent course(s). This gives the faculty of the subsequent course(s) the opportunity to make any necessary adjustments.

Assessment data is posted on the S drive for any interested math faculty member to review.

Our assessment data is consistent with our desired results so no major changes have been made.

**Describe how students and external stakeholders (advisory boards, employers, community, alumni, etc.) are made aware of PSLOs and measures.**

Course syllabi list the PSLOs, the measures used to assess them, and aggregate results from previous semesters indicating if the measures have been satisfied. Faculty also are asked to indicate to students which specific assignments are addressing PSLOs.

The department organizes an “Actuarial Advisory Board” which meets once a year. This Board is comprised of practicing actuaries from Topeka, Kansas City, and Wichita. About half of the Board members are Washburn graduates. The Board discusses the current professional credentialing exam sequence, our curriculum, and what employers are looking for when hiring new graduates.

We currently have about 5 students placed in internships in Topeka companies. Dr. Mosier is in regular contact with these employers and receives feedback on what preparation they want our students to have. This information is used to adjust our curriculum if needed.

The department conducts exit interviews for its graduating seniors. These interviews give students the opportunity to voice concerns and/or offer suggestions for changes to the Program. Each student is interviewed separately by two different Mathematics faculty members. Several math faculty participate in the interview process. The overall results are compiled into a single file and placed on the S drive for all Mathematics faculty to view. In the past, Program changes have been made due to concerns/suggestions given in exit interviews. Recently there have been no suggestions for major changes to the Program.

The exit interview contains an anonymous portion. Questions on the anonymous portion reflect the PSLOs.

The Mathematics Department believes that the American Statistical Association and the Society of Actuaries are important stakeholders in our Actuarial Science program. We continue to monitor changes and suggestions made by these organizations. If and when these organizations suggests changes, we will adjust our major accordingly.

<b>2014-2015 Academic Year</b>			
<b>Program Student Learning Outcomes Analyzed and Reported for Current Year</b>	List the Assessment Measure(s) for each PSLO – if rubrics are used, a copy of each should be in your department’s assessment subfolder on the shared drive	Describe the results for PSLOs analyzed (assessed) <b>this</b> year – a copy of summary data should be in your department’s assessment subfolder on the shared drive	Describe how results are <b>shared</b> with <b>faculty, students, university-wide entities, and stakeholders</b> (advisory boards, employers, community, alumni, etc.)
<b>PSLO # <u>3</u></b> Demonstrate the ability to communicate mathematics and statistical results both orally and in writing.	<b>Direct:</b> 6) 70% of all students completing courses MA 301, MA 343, MA 346, and MA 348 will obtain a C or better in the course. 7) 70% of all students completing MA 301 will have an average of 2.5 (out of 4) on the course communication assignment(s) using the Departmental rubric. 8) 70% of all students completing MA 343 will have an average of 2.5 (out of 4) on the course communication assignment(s) using the Departmental rubric. 9) 70% of all students completing MA 346 will have an average of 2.5 (out of 4) on the course communication assignment(s) using the Departmental rubric. 10) 70% of all students completing MA 348 will have an average of 2.5 (out of 4) on the course communication assignment(s) using the Departmental rubric.	6) For the 2014-2015 year, at least 70% of all students completing courses MA 301, MA 343, MA 346, and MA 348 earned a C or better in the course. 7) In Fall 2014, 97.14% of students in MA 301 had an average of 2.5 or higher on a project requiring application of course knowledge to a novel situation and developed a written response in the form of a project report. 8) 87.5% of students in Spring 2015 MA 343 had an average of > 2.5 on the communication project. 9) 100% of students in MA 346 had an average of > 2.5 on the communication rubric, and the overall class average was 3.475. 10) 100% of students in MA 348 had an average of > 2.5 on the communication rubric, and the overall class average was 3.525.	The Departmental Secretary compiles and distributes a Grade Distribution document to all math faculty. This document shows the percentage of students who received A, B, C, etc. in Mathematics courses.  The graded assignments were returned to students in a timely fashion.  The summary results regarding PSLO #3 will be provided to all faculty who regularly teach upper level statistics courses. The full results will be shared with all interested faculty, who will be identified through an e-mail request.  The Actuarial Advisory Board does not receive specific information on our assessment assignments. However, the Board is made aware of curriculum practices regarding the courses we offer and the course content.  All tenured/tenure-track faculty are invited to conduct exit interviews. Responses from exit interviews are combined into a single document and posted on the S drive in the Mathematics folder. Faculty are made aware that the document is available for them to view. A copy of the document is sent directly to the Department Chair.
	<b>Indirect:</b> 3. No more than 20% of the students responding will mention this as a concern during their free-response exit interview.	3. Seven graduating seniors participated in the free-response exit interviews during 2014-2015. The comments on the free-response portion of the exit	

	<p>4. 70% of the students responding to the anonymous portion of the exit interview will indicate “Good”, “Very Good”, or “Excellent” on questions related to this PSLO.</p>	<p>interviews were overwhelming positive by 100% of the students.</p> <p>4. Four students completed the anonymous portion of the exit interviews in 2014-2015. 100% of these students gave a rating of “Good”, “Very Good”, or “Excellent” on questions related to this PSLO.</p>	
<p><b>PSLO # <u>4</u></b>          Demonstrate the ability to identify and utilize the appropriate practices and tools, including the use of technology, to solve mathematics problems and perform statistical modeling and analysis of data.</p>	<p><b>Direct:</b></p> <p>7. 70% of all students completing courses MA 153, MA 301, MA 343, MA 346, MA 348, and MA 385 will obtain a C or better in the course.</p> <p>8. 70% of all students completing MA 153 will obtain an average of 2.5 (out of 4) on course project(s) using the Departmental rubric.</p> <p>9. 70% of all students completing MA 301 will have an average of 2.5 (out of 4) on the course project(s) using the Departmental rubric.</p> <p>10. 70% of all students completing MA 343 will have an average of 2.5 (out of 4) on the course project(s) using the Departmental rubric.</p> <p>11. 70% of all students completing MA 346 will have an average of 2.5 (out of 4) on the course project(s) using the Departmental rubric.</p> <p>12. 70% of all students completing MA 348 will have an average of 2.5 (out of 4) on the course project(s) using the Departmental rubric.</p>	<p>7. For the 2014-2015 year, at least 70% of all students completing courses MA 153, MA 301, MA 343, MA 346, MA 348, and MA 385 earned a C or better in the course.</p> <p>8. In Fall 2014, three projects requiring use of the computer algebra system Maple were assessed in MA 153. The projects were graded according to the 4-point departmental rubric, then those scores were averaged. 10 out of 12 students (83.3%) obtained an average of 2.5 or higher, meeting the objective. In Spring 2015, 9 of the 11 students enrolled in MA 153 (81.8%) averaged 2.5 or higher on the course projects according to the department’s rubric.</p> <p>9. In Fall 2014, 97.14% of students in MA 301 had an average of 2.5 or higher on a project requiring the use of technology.</p> <p>10. 81.3% of students in MA 343 had an average of &gt; 2.5 on challenging applied problems rubric, and the overall class average was 3.03.</p> <p>11. 100% of students had an average of &gt; 2.5 on the ability to perform statistical modeling rubric, and</p>	<p>The Departmental Secretary compiles and distributes a Grade Distribution document to all math faculty. This document shows the percentage of students who received A, B, C, etc. in Mathematics courses.</p> <p>The graded assignments were returned to students in a timely fashion.</p> <p>The summary results regarding PSLO #4 will be provided to all faculty who regularly teach upper level statistics courses. The full results will be shared with all interested faculty, who will be identified through an e-mail request.</p> <p>The Actuarial Advisory Board does not receive specific information on our assessment assignments. However, the Board is made aware of curriculum practices regarding the courses we offer and the course content.</p> <p>All tenured/tenure-track faculty are invited to conduct exit interviews. Responses from exit interviews are combined into a single document and posted on the S drive in the Mathematics folder. Faculty are made aware that the document is available for them to view. A copy of the document is sent directly to the Department Chair.</p>

		<p>the overall class average was 3.425.</p> <p>12. 100% of students in MA 348 had an average of &gt; 2.5 on the ability to perform statistical modeling rubric, and the overall class average was 3.425</p>	
	<p><b>Indirect:</b></p> <p>3. No more than 20% of the students responding will mention this as a concern during their free-response exit interview.</p> <p>4. 70% of the students responding to the anonymous portion of the exit interview will indicate “Good”, “Very Good”, or “Excellent” on questions related to this PSLO.</p>	<p>3. Seven graduating seniors participated in the free-response exit interviews during 2014-2015. The comments on the free-response portion of the exit interviews were overwhelming positive by 100% of the students.</p> <p>4. Four students completed the anonymous portion of the exit interviews in 2014-2015. 100% of these students gave a rating of “Good”, “Very Good”, or “Excellent” on questions related to this PSLO.</p>	

**Discuss the implications of the results reported above and how faculty members are involved in using assessment data to improve student learning.**

Many of our Program courses are taught by the same instructor each time the course is offered. These instructors use results to make any necessary changes to their course(s).

Assessment data for courses that are taught by multiple faculty are shared with the respective faculty. These faculty then discuss results together and decide what, if any changes, should be made.

Faculty who teach a prerequisite course to another Program course share assessment data with the instructor(s) of the subsequent course(s). This gives the faculty of the subsequent course(s) the opportunity to make any necessary adjustments.

Assessment data is posted on the S drive for any interested math faculty member to review.

Our assessment data is consistent with our desired results so no major changes have been made.

**Describe how students and external stakeholders (advisory boards, employers, community, alumni, etc.) are made aware of PSLOs and measures.**

Course syllabi list the PSLOs and the measures used to assess them. Faculty also are asked to indicate to students which specific assignments are addressing PSLOs.

The department organizes an “Actuarial Advisory Board” which meets once a year. This Board is comprised of practicing actuaries from Topeka, Kansas City, and Wichita. About half of the Board members are Washburn graduates. The Board discusses the current professional credentialing exam sequence, our curriculum, and what employers are looking for when hiring new graduates.

We currently have about 5 students placed in internships in Topeka companies. Dr. Mosier is in regular contact with these employers and receives feedback on what preparation they want our students to have. This information is used to adjust our curriculum if needed.

The department conducts exit interviews for its graduating seniors. These interviews give students the opportunity to voice concerns and/or offer suggestions for changes to the Program. Each student is interviewed separately by two different Mathematics faculty members. Several math faculty participate in the interview process. The overall results are compiled into a single file and placed on the S drive for all Mathematics faculty to view. In the past, Program changes have been made due to concerns/suggestions given in exit interviews. Recently there have been no suggestions for major changes to the Program.

The exit interview contains an anonymous portion. Questions on the anonymous portion reflect the PSLOs.

Every five years the Department conducts an alumni survey. The alumni survey results are included as part of our Program Review.

The Mathematics Department believes that the American Statistical Association and the Society of Actuaries are important stakeholders in our Actuarial Science program. We continue to monitor changes and suggestions made by these organizations. If and when these organizations suggests changes, we will adjust our major accordingly.

2013-2014 Academic Year			
Program Student Learning Outcomes Analyzed and Reported for Current Year	List the Assessment Measure(s) for each PSLO – if rubrics are used, a copy of each should be in your department’s assessment subfolder on the shared drive	Describe the results for PSLOs analyzed (assessed) this year – a copy of summary data should be in your department’s assessment subfolder on the shared drive	Describe how results are shared with faculty, students, university-wide entities, and stakeholders (advisory boards, employers, community, alumni, etc.)
<b>PSLO # <u>1</u></b> Demonstrate the ability to solve a variety of problems in mathematics including calculus, probability and statistics, and linear algebra.	<b>Direct:</b> 70% of all students completing MA151, MA152, MA153, MA301, MA343 will obtain a C or better in the course.  70% of all students completing MA151 will obtain an average of 2.5 (out of 4) on specified assessment assignments using the Departmental rubric.	In 2013-2014, at least 70% of students completing MA151, MA152, MA153, MA301, MA343 received a C or better in the respective course.  All Fall and Spring sections of MA151 Calculus I gave four assessment assignments to their classes. These assignments covered the topics of limits, derivatives, applications of derivatives, and integrations. The assignments were graded with the departmental rubric. In both Fall 2013 and Spring 2014, the percentage of students earning at least a 2.5 (out of 4) was over 70% for each of the four assignments.	The Departmental Secretary compiles and distributes a Grade Distribution document to all math faculty. This document shows the percentage of students who received A, B, C, etc. in Mathematics courses.  The graded assessment assignments in MA151 were returned to students with comments indicating the reasons for the particular scores. These assignments were returned to students before the corresponding exams.  The instructors of MA151 from Fall/Spring discussed the content of the assessment assignments with the Department Chair. The instructors of MA151 also discussed the student performance on these assignments. The student performance results were given to the instructors of MA152 for the subsequent semesters. Results are also posted in a Departmental folder on the S drive.
	<b>Indirect:</b> Exit Interviews	All graduating students were asked to participate in face-to-face exit interviews with departmental	

		faculty. Those who chose to participate were also given exit questions which were returned anonymously. Of our 10 graduating Seniors, 9 participated in the face-to-face exit interviews and 6 of those returned the anonymous portion.	All tenured/tenure-track faculty are invited to conduct exit interviews. Responses from exit interviews are combined into a single document and posted on the S drive in the Mathematics folder.
<p><b>PSLO # <u>2</u></b> Demonstrate the ability to write mathematical proofs and solve challenging problems both pure and applied.</p>	<p><b>Direct:</b> 70% of all students MA250, MA343, MA344, MA345, MA347, MA385 will obtain a C or better in the course.  70% of all students completing MA 343 will have an average of 2.5 (out of 4) on projects using the Departmental rubric.</p>	<p>In 2013-2014, at least 70% of students completing MA343, MA344, MA345, MA347, MA385 received a grade of C or better. MA250 was not offered in 2013-2014.  MA343 assessed applied statistical problems on the final exam. The problems were graded with the departmental rubric. 90.5% of all students had an average of at least 2.5 (out of 4) on the problems. The overall class average was 3.10.</p>	<p>The Departmental Secretary compiles and distributes a Grade Distribution document to all math faculty. This document shows the percentage of students who received A, B, C, etc. in each Mathematics course.  The summary results from the MA343 final exam problems will be provided to all faculty who regularly teach upper level statistics courses. The full results will be shared with all interested faculty, who will be identified through an e-mail request.</p>
	<p><b>Indirect:</b> Exit Interviews</p>	<p>See comments from PSLO #1 regarding exit interviews.</p>	
<b>Describe how faculty members were involved in using assessment data to improve student learning.</b>			
<p>Many of our Program courses are taught by the same instructor each time the course is offered. These instructors use results to make any necessary changes to their course(s).</p> <p>Assessment data for courses that are taught by multiple faculty are shared with the respective faculty. These faculty then discuss results together and decide what, if any changes, should be made.</p> <p>Faculty who teach a prerequisite course to another Program course share assessment data with the instructor(s) of the subsequent course(s). This gives the faculty of the subsequent course(s) the opportunity to make any necessary adjustments.</p> <p>Assessment data is posted on the S drive for any interested math faculty member to review.</p> <p>Our assessment data is consistent with our desired results so no major changes have been made.</p>			
<b>Describe how stakeholders are engaged in your assessment plan and process.</b>			
<p>The department conducts exit interviews for its graduating seniors. These interviews give students the opportunity to voice concerns and/or offer suggestions for changes to the Program. Each student is interviewed separately by two different Mathematics faculty members. Several math faculty participate in the interview process. The overall results are compiled into a single file and placed on the S drive for all Mathematics faculty to view. In the past, Program changes have been made due to concerns/suggestions given in exit interviews. Recently there have been no suggestions for major changes to the Program.</p>			

The exit interview contains an anonymous portion. Questions on the anonymous portion mimic those that are sent to our alumni every five years. The alumni results are included as part of our Program Review. The department plans to compare results from our recent graduates to those of our alumni the next time the alumni survey is completed.

## SECTION III

### 2016-2017 Academic Year

During this year, if any PSLO was addressed through new or unique experiences outside the classroom, explain where and how the opportunities were provided to students in your program (i.e. internships, field experiences, visiting lectures, collaborative projects, and other creative ideas you have employed).

N/A

### 2015-2016 Academic Year

During this year, if any PSLO was addressed through new or unique experiences outside the classroom, explain where and how the opportunities were provided to students in your program (i.e. internships, field experiences, visiting lectures, collaborative projects, and other creative ideas you have employed).

N/A

### 2014-2015 Academic Year

During this year, if any PSLO was addressed through new or unique experiences outside the classroom, explain where and how the opportunities were provided to students in your program (i.e. internships, field experiences, visiting lectures, collaborative projects, and other creative ideas you have employed).

N/A

### 2013-2014 Academic Year

During this year, if any PSLO was addressed through new or unique experiences outside the classroom, explain where and how the opportunities were provided to students in your program (i.e. internships, field experiences, visiting lectures, collaborative projects, and other creative ideas you have employed).

N/A

## SECTION IV

### 2016-2017 Academic Year

In light of what you have learned through your assessment efforts this year, what are your plans for the next academic year?

One instructor did not provide assessment information in time to be included in this report. During the fall Department meeting, the assessment liaison will emphasize the importance of reporting information in a timely manner (original request was for assessment information to be received by May 30). Next year the liaison will inform the Chair immediately if instructors do not submit their assessment information by the requested date.

During the exit interviews, three comments were made by students with regards to the Actuary Track that need to be taken into consideration by the Department. The most negative comment was in regards to the teaching ability of a specific Mathematics Instructor. This instructor is no longer at Washburn. However, the Department recognizes that it should try to improve its hiring practices in order to prevent hiring a faculty member who does not meet the high teaching standards of the University and our Department.

The other two comments were not negative in nature, but offered suggestions for improvement and/or change. This information was also provided in Section II of this report, but it seems appropriate to include it here as well. One comment suggested that the Department encourage our students in the Actuarial Track to pursue a BS (specifically with a minor in Computer Information Sciences) rather than a BA degree. The other comment indicated that some of the Business courses required for the major were not helpful and that the Math Department should consider either dropping these courses as a requirement or replacing them with other Business courses.

### **2015-2016 Academic Year**

**In light of what you have learned through your assessment efforts this year and in past years, what are your plans for the next academic year?**

No major changes are planned. The Department has recently reviewed our course numbering system. After making comparisons with other institutions, we have submitted paperwork to have MA 250 Theory of Interest to be changed to MA 384 Theory of Interest. At the Actuary Advisory Board meeting, the Department asked the Board about necessary computing skills. The Department will spend the next year looking in to our course requirements to see if an addition and/or change should or could be made to give students more exposure to computing skills before graduation. The Advisory Board suggested that it is best for students to take attempt their first SOA exam in their Junior year. The Board felt early exposure to the exams is important, regardless of whether the students pass the exam in their Junior year. The Department will look into ways to encourage our students to take their first SOA exam in their Junior year.

### **2014-2015 Academic Year**

**In light of what you have learned through your assessment efforts this year and in past years, what are your plans for the next academic year?**

Since data is consistent with our desired results, no major changes are anticipated for the Program.

### **2013-2014 Academic Year**

**In light of what you have learned through your assessment efforts this year and in past years, what are your plans for the next academic year?**

Since data is consistent with our desired results, no major changes are anticipated for the Program.

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***Supporting documents (rubrics, summary data tables/charts, etc.) should be in your department's assessment subfolder on the shared drive in the correct academic year subfolder.***