2021-2022 Assessment Cycle

Assessment Findings

Program Assessment Accomplishments

This year, the Physics & Astronomy department dramatically expanded and improved our assessment practices.

Following an assessment retreat during the Spring 2022 semester we finalized a number of rubrics and specified which courses and rubrics will apply to each PSLO. We also developed entirely new rubrics for evaluating student capstone projects and presentations. We also developed an entirely new survey for recent graduates, with both general questions and questions focused specifically on the PSLOs.

We have used course-embedded assignments in several courses, overall course grades in some places, and our graduate survey, to evaluate measures. No student capstone projects were evaluated this year as our rubrics were not finalized in time.

Overall, our department has made large strides this year in coordinating and making more concrete our assessment efforts. We look forward to gathering more data over the coming years and increasing the significance of results with larger numbers.

Finding per Measure

BA - Physics Outcome Set

PSLO 1

Outcome: Solve problems requiring a conceptual and analytical knowledge of the major areas of physics.

Measure: Course-Embedded Assignments
Program level Direct - Student Artifact

Details/Description:	Student work in specific courses will be evaluated using department-wide rubric for this PSLO.
Acceptable Target:	70% of students will score an average of 3 or higher on the rubric.

Supporting Attachments:

PSLO 1 Assignment rubric (Adobe Acrobat Document)

Findings for Course-Embedded Assignments

Summary of Findings:	Two courses applied to this PSLO this year: PS320: 50% of students met threshold. Enrollment was very small (2 students). Only one student significantly participated. Difficult to draw much information due to this small enrollment and participation. Instructor is considering adding online notes on computational techniques to give students another reference resource. PS334: 83% of students met threshold. Averaged over both classes the % met is 67%. This is not quite at our target, but skewed low due to issues in PS320.
Results :	Acceptable Target Achievement: Not Met
Recommendations:	
Reflections/Notes:	

Measure: Graduate Survey

Program level Indirect - Survey

Details/Description:	Specific questions on survey of recent graduates.
Acceptable Target:	Average value of 4 or greater (out of 5-point scale) on relevant survey question (#7). (Also subjectively evaluated using written feedback on survey questions.)

Supporting Attachments:

Graduate Survey (Adobe Acrobat Document)

Findings for Graduate Survey

Summary of Findings:	We had 3 responses with an average of 4.67/5 on this question. Respondents identified group problem solving and real-world/application focused problems as most helpful.
Results :	Acceptable Target Achievement: Met
Recommendations:	
Reflections/Notes:	

PSLO 2

Outcome: Construct and solve mathematical models of physical phenomena.

Measure: Course Grade
Program level Direct - Student Artifact

Details/Description:	Course grade in PS365 Intro to Theoretical Physics (course specifically designed for this outcome).
Acceptable Target:	70% of students achieve C or better

Findings for Course Grade

Summary of Findings:	4 students enrolled in PS365 but only 2

finished the course.

100% of those students who finished met the threshold of course grade of C or better.

Results : Acceptable Target Achievement: Exceeded

Recommendations:

Reflections/Notes:

Measure: Course-Embedded Assignments

Program level Direct - Student Artifact

Details/Description: Student work in specific courses will be evaluated using department-wide rubric for this PSLO.

Acceptable Target: 70% of students will score an average of 3 or higher on the rubric.

Supporting Attachments:

PSLO 2 Assignment rubric (Adobe Acrobat Document)

Findings for Course-Embedded Assignments

Summary of Findings: These courses applied to this PSLO this year:

PS320:
50% of students met threshold.
Enrollment was very small (2 students). Only one student significantly participated.
Difficult to draw much information due to this small enrollment and participation.
Instructor is considering adding online notes on computational techniques to give students another reference resource.

PS334:
100% of students met threshold.

PS366:
67% of students met threshold
Enrollment was very small (3 students). Only one student significantly participated. It is hard to draw much information from these numbers due to the low enrollment and the lack of student engagement in the class. Instructor plans to modify the assignments somewhat to decrease the amount of time required to do them while still giving students the opportunity to practice the material introduced in class, in the hope that more students will do the homework.

Averaged over all classes the % met is 79%

Results : Acceptable Target Achievement: Met

Recommendations:

Reflections/Notes:

Measure: Graduation Survey

Program level Indirect - Survey

Details/Description: Specific questions on survey of recent graduates.

Acceptable Target: Average value of 4 or greater (out of 5-point scale) on relevant survey question (#9).
(Also subjectively evaluated using written feedback on survey questions.)

Supporting Attachments:

Graduate Survey (Adobe Acrobat Document)

Findings for Graduation Survey

Summary of Findings: We had 3 responses with an average of

	4.67/5 on this question. Respondents identified computational and electronics courses as helpful in developing this skill.
Results :	Acceptable Target Achievement: Met
Recommendations:	
Reflections/Notes:	

PSLO 3

Outcome: Design and conduct experiments consistent with accepted disciplinary practices.

Measure: Capstone Project Evaluation
Program level Direct - Student Artifact

Details/Description:	Students who complete the B.S. in Physics or B.S. in Computational Physics at Washburn must make progress on a research project while taking either PS 360 or PS 368 to receive their degree. (This requirement does not apply to students in the Engineering Transfer Program, who take most of their upper-division courses at another institution.) Students are evaluated using two similar rubrics - one for the instructor (project mentor) and one for an independent faculty member who evaluates project based on student presentation.
Acceptable Target:	70% of students will score an average of 3 or higher on the rubric.
Supporting Attachments:	

Capstone Project Rubric - Instructor (Adobe Acrobat Document)

Capstone Project Rubric - Other faculty (Adobe Acrobat Document)

Findings for Capstone Project Evaluation

Summary of Findings:	No students were evaluated this year for this measure.
Recommendations:	
Reflections/Notes:	

Measure: Course-Embedded Assignments

Program level Direct - Student Artifact

Details/Description:	Student work in specific courses will be evaluated using department-wide rubric for this PSLO.
Acceptable Target:	70% of students will score an average of 3 or higher on the rubric.

Supporting Attachments:

PSLO 3 Assignment rubric (Adobe Acrobat Document)

Findings for Course-Embedded Assignments

Summary of Findings:	These courses applied to this PSLO this year: PS322: 100% students met threshold (2 students evaluated) PS340: 100% students met threshold (3 students evaluated)

Results : Acceptable Target Achievement: Exceeded

Recommendations:

Reflections/Notes:

Measure: Graduate Survey

Program level Indirect - Survey

Details/Description: Specific questions on survey of recent graduates.

Acceptable Target: Average value of 4 or greater (out of 5-point scale) on relevant survey question (#11).
(Also subjectively evaluated using written feedback on survey questions.)

Supporting Attachments:

Graduate Survey (Adobe Acrobat Document)

Findings for Graduate Survey

Summary of Findings: We had 3 responses with an average of 3.67/5 on this question.

Respondents identified capstone project and self-led course projects as most helpful, but one student indicated that many experimental projects were too pre-defined and did not allow for student to design project themselves.

We did not meet the 4/5 threshold, but sample size is also small.

While sample size is small, an important take-away is that self-directed projects are more helpful and impactful for students.

Results : Acceptable Target Achievement: Not Met

Recommendations:

Reflections/Notes:

PSLO 4

Outcome: Recognize how observation, experiment, and theory are complementary components the research process resulting in the expansion of knowledge.

Measure: Capstone Project Evaluation

Program level Direct - Student Artifact

Details/Description: Students who complete the B.S. in Physics or B.S. in Computational Physics at Washburn must make progress on a research project while taking either PS 360 or PS 368 to receive their degree. (This requirement does not apply to students in the Engineering Transfer Program, who take most of their upper-division courses at another institution.)

Students are evaluated using two similar rubrics - one for the instructor (project mentor) and one for an independent faculty member who evaluates project based on student presentation.

Acceptable Target: 70% of students will score an average of 3 or higher on the rubric.

Supporting Attachments:

Capstone Project Rubric - Instructor (Adobe Acrobat Document)

Capstone Project Rubric - Other faculty (Adobe Acrobat Document)

Findings for Capstone Project Evaluation

Summary of Findings:	No students were evaluated this year for this measure.
Recommendations:	
Reflections/Notes:	

Measure: Graduate Survey

Program level Indirect - Survey

Details/Description:	Specific questions on survey of recent graduates.
Acceptable Target:	Average value of 4 or greater (out of 5-point scale) on relevant survey question (#13). (Also subjectively evaluated using written feedback on survey questions.)

Supporting Attachments:

Graduate Survey (Adobe Acrobat Document)

Findings for Graduate Survey

Summary of Findings:	We had 3 responses with an average of 5/5 on this question. Respondents identified capstone projects, lab exercises, and computational modeling activities as helpful here.
Results :	Acceptable Target Achievement: Exceeded
Recommendations:	
Reflections/Notes:	

PSLO 5

Outcome: Communicate scientific information in oral, written, and graphic formats.

Measure: Capstone Presentation
Program level Direct - Student Artifact

Details/Description: Students who complete the B.S. in Physics or B.S. in Computational Physics at Washburn must make a presentation about their research project while taking either PS 360 or PS 368 to receive their degree. (This requirement does not apply to students in the Engineering Transfer Program, who take most of their upper-division courses at another institution.)

Acceptable Target: 70% of students will score an average of 3 or higher on the rubric.

Supporting Attachments:

Capstone Presentation Rubric (Adobe Acrobat Document)

Findings for Capstone Presentation

Summary of Findings: No students were evaluated this year for this measure.

Recommendations:

Reflections/Notes:

Measure: Course-Embedded Assignments
Program level Direct - Student Artifact

Details/Description:	Presentations, both written and oral, are required as assignments in certain courses. We use the Capstone Presentation rubric here; note the rubric language refers more to oral presentations but can be used for either oral or written.
Acceptable Target:	70% of students will score an average of 3 or higher on the rubric.

Supporting Attachments:

Capstone Presentation Rubric (Adobe Acrobat Document)

Findings for Course-Embedded Assignments

Summary of Findings:

These courses applied to this PSLO this year:

PS322:
100% students met threshold (2 evaluated)

PS340:
67% students met threshold (3 evaluated)
Each of the three students successfully completed the final project, however one of the students did not score well on their presentation (4/10 points) due to a lack of preparation and/or not taking the project presentation seriously. The other two students did put effort and preparation into their presentations.

PS366:
67% students met threshold (3 evaluated)
2 of 3 students performed well on presentation of final project.

As with most of our courses this year, small numbers makes drawing conclusions difficult. While 67% is below our threshold,

this represents 2 of 3 achieving success.

Averaged over the courses we have 78% so overall the threshold is met for this PSLO.

Results : Acceptable Target Achievement: Met

Recommendations:

Reflections/Notes:

Measure: Graduate Survey
Program level Indirect - Survey

Details/Description: Specific questions on survey of recent graduates.

Acceptable Target: Average value of 4 or greater (out of 5-point scale) on relevant survey question (#15).
(Also subjectively evaluated using written feedback on survey questions.)

Supporting Attachments:

Graduate Survey (Adobe Acrobat Document)

Findings for Graduate Survey

Summary of Findings: We had 3 responses with an average of 3.67/5 on this question.

Respondents identified capstone project as helpful here as well as presentations regional scientific meetings (KINBRE).

One respondent noted that they had few opportunities to practice this skill.

We conclude that the department could do more to provide opportunities for formal presentations.

	The threshold is not quite met, but again we have a small sample size (only 3 respondents).
Results :	Acceptable Target Achievement: Not Met
Recommendations:	
Reflections/Notes:	

PSLO 6

Outcome: Use computational methods to simulate, analyze, and present data from physical systems.

Measure: Course Grade
Program level Direct - Student Artifact

Details/Description:	Course grade in PS366 Computational Physics (course specifically designed for this outcome).
Acceptable Target:	70% of students achieve C or better

Findings for Course Grade

Summary of Findings:	67% of students met threshold (3 students evaluated) Low enrollment again skews these results - 2 of 3 students met the threshold. It is hard to draw much information from these numbers due to the low enrollment and the lack of student engagement in the class. In the future instructor plans to modify

	the assignments somewhat to decrease the amount of time required to do them while still giving students the opportunity to practice the material introduced in class, in the hope that more students will do the homework.
Results :	Acceptable Target Achievement: Not Met
Recommendations:	
Reflections/Notes:	

Measure: Course-Embedded Assignments

Program level Direct - Student Artifact

Details/Description:	Student work in specific courses will be evaluated using department-wide rubric for this PSLO.
Acceptable Target:	70% of students will score an average of 3 or higher on the rubric.

Supporting Attachments:

PSLO 6 Assignment rubric (Adobe Acrobat Document)

Findings for Course-Embedded Assignments

Summary of Findings:	These courses applied to this PSLO this year: PS320: Neither of the 2 enrolled students completed the assigned project used for this measure and so no conclusion is possible. PS340: 100% students met threshold (3 evaluated) PS365: 50% students met threshold (2 evaluated)

Only 2 students completed the course. Of these, 1 student did not complete most of the computational assignments. The remaining student who completed the assignments met the threshold.
It is hard to draw conclusions here, except that students may need more support in completing the computing assignments (since the class is not specifically on this topic).

PS366:
67% students met threshold (3 evaluated)
It is hard to draw much information from these numbers due to the low enrollment and the lack of student engagement in the class. In the future instructor plans to modify the assignments somewhat to decrease the amount of time required to do them while still giving students the opportunity to practice the material introduced in class, in the hope that more students will do the homework.

As with most of our courses this year, small numbers makes drawing conclusions difficult.

Averaged over the courses we have 72% so overall the threshold is met for this PSLO.

Results :

Acceptable Target Achievement: Met

Recommendations:

Reflections/Notes:

Measure: Graduate Survey
Program level Indirect - Survey

Details/Description:	Specific questions on survey of recent graduates.
Acceptable Target:	Average value of 4 or greater (out of 5-point scale) on relevant survey question (#17). (Also subjectively evaluated using written feedback on survey questions.)

Supporting Attachments:

Graduate Survey (Adobe Acrobat Document)

Findings for Graduate Survey

Summary of Findings:	We had 3 responses with an average of 4.67/5 on this question. Respondents identified course final projects and capstone project as most helpful in developing this skill. Students identified faculty practices of providing code examples with plenty of guidance and comments as especially helpful.
Results :	Acceptable Target Achievement: Met
Recommendations:	
Reflections/Notes:	

Overall Recommendations

We will continue applying new rubrics to accumulate data to reach more significant conclusions.

Based on some results from the graduate survey, the department should consider increasing opportunities for students to practice presentation skills. We have taken one step on this already by formalizing assessment of

capstone presentation (which has not been done in the past).

Overall Reflection

This past year we had a very small number of students in the 300-level courses used to evaluate most of our PSLO measures. In most cases enrollment was 2 or 3 students. We also found a lack of student engagement in some courses, with some students failing to even complete assignments.

This problem of small numbers makes it difficult to really evaluate our PSLO measures. In several places a measure threshold was not met because only 2 of 3 students met the threshold landing us at 67%, just below our 70% cut off. While we have taken 67% as below the threshold, and marked "Not Met" in some areas, it is important to keep in mind this small-numbers problem.

We found comments on the graduate survey especially helpful in identifying department practices and experiences that are most useful for students, as well as areas that can be improved on. Again, however, we have a small-numbers problem, with only 3 graduates responding to the survey, making the numerical results less significant.

Faculty Collaboration

All three faculty who teach 300-level courses (Dr. Karen Camarda, Dr. Brian Thomas, Dr. Vince Rossi) contributed to developing the assessment plan and collected assessment data. Dr. Thomas compiled data and completed this report.

Communication & Collaboration with Students

Primary student involvement was via graduate survey.

Communication & Collaboration with External Stakeholders

No relevant external stakeholders have been identified.

Communication & Collaboration with University

Department sought and received a grant for assessment retreat. Dr. Thomas attended training on Taskstream and assessment reporting.

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