Assurance of Student Learning Reflection 2024-2025	
Ogden College of Science and Engineering	*Pysics and Astronomy*
Physics 754	
Michael Carini	
Is this an online program? ☐ Yes ☒ No	Please make sure the Program Learning Outcomes listed match those in CourseLeaf. Indicate verification here ☒ Yes, they match! (If they don't match, explain on this page under **Evaluation)**

Instructions: For the 2024-25 assessment, we are asking you to reflect on the last three-year cycle rather than collect data. It's important to take time to look over the results from the last assessment cycle and really focus on a data-informed direction going forward. In collaboration with your assessment team and program faculty, review each submitted template from 2021-2024 and consider the following for each Program Learning Outcome, add your narrative to the template, and submit the draft to your ASL Rep by May 15, 2025.

Program Student Learning Outcome 1	
Program Student Learning Outcome	Students will show a mastery of foundational principles and requisite mathematics.
Evaluation	Over the last three assessment cycles, we met our target every year. We have decided to take this very general outcome and focus our assessment on two new learning outcomes for the program: *Demonstrate the use of analytical and numerical methods to solve contextual problems in Physics* & *Demonstrate an understanding of how to collect, analyze and interpret scientific data.*
Measurement Instruments	Our analysis indicates the instrument was actually measuring the outcome. This instrument will continue to be used to help assess the new SLO of *Demonstrate the use of analytical and numerical methods to solve contextual problems in Physics*.
Criteria & Targets	After lengthy discussion, we found the criteria was not worded clearly and different program faculty had different interpretations of the criteria. Thus, we will reword the target to be clear as to our meaning for the next assessment cycle; however the actual target will remain unchanged.
Results & Conclusion	**Results**: The results are what we expected over the past 3 years. We noted that over the past three years, our student scores on the MFT were slowly increasing. **Conclusions**: We conclude the observed increase in average student MFT scores is a result of both a change in the curriculum of the introductory physics courses made 5 years ago as well as better feedback between instructors at the introductory and upper division courses.

****IMPORTANT - Plans for Next Assessment Cycle**:	For the next assessment cycle, we will break this learning outcome into two new targeted learning outcomes: 1.Demonstrate the use of analytical and numerical methods to solve contextual problems in Physics. Instrument: MFT Scores. Target The median total score of the cohort shall be above the national median score. Instrument: Scores on final project presentations in upper division Physics courses, evaluated via a rubric. Target: 80% of students will score 80% or better on final project presentations in upper division Physics courses. 2. Demonstrate an understanding of how to collect, analyze and interpret scientific data. Instrument: Experiment scores from Physics 302. Target: 80% of students will receive a score of 80% or better on the experiment reports completed in Physics 302.

Program Student Learning Outcome 2	
Program Student Learning Outcome	**Students will develop a mastery of empirical methods via written expression**
Evaluation	Over the last three assessment cycles, we met our target every year. Based on the initial writing samples produced by the students at the beginning of Physics 498, program faculty remain dissatisfied with the level at which some of our students are able to communicate science in a written format. The program faculty feel this is a valid assessment item; communicating science is an important skill for our graduates to master. However the program believes this is better combined with SLO 3: Students will develop a mastery of empirical methods via oral expression and retitled: Demonstrate effective oral and written communication of scientific analysis and results.
Measurement Instruments	Our analysis indicates the instrument was actually measuring the outcome. This instrument will continue to be used to help assess the new SLO of *Demonstrate effective oral and written communication of scientific analysis and results*. The associated evaluation rubric will be modified to clarify certain rubric scoring items. We are not concerned about negative effects of AI on this item; AI cannot accurately reproduce the specifics of an experiment performed by the students.

Criteria & Targets	Criteria and targets were found to be valid and appropriate for the SLO and will not need to be changed.
Results & Conclusion	**Results**: The results are what we expected over the past 3 years. Despite 100% achievement of the target, we find some of our students continue to struggle with written expression despite the fact that the results of this assessment are fed back to lower level courses (particularly lab courses) where written scientific communication is emphasized. We do not see this as a problem with the assessment, or the criteria for success, but rather as a more global issue with our students abilities. **Conclusions**: The feedback from the assessment in Physics 498 back to other classes is showing positive results. Despite achieving the target, the assessment is also showing some students make it to their final year in the program with sub-par writing skills as discussed previously. We have discussed the feasibility of changing from relying on English 300: Writing in the Disciplines to properly train our students in scientific communication. Two options are we find the resources to offer our own such course, or we piggyback on other such courses offered in the college. In addition, the department curriculum committee will discuss and recommend whether or not a more formal written capstone experience is needed in the program.
****IMPORTANT - Plans for Next Assessment Cycle**:	For the next assessment cycle, we will combine this SLO with SLO 3 and reword it as follows: **Demonstrate effective oral and written communication of scientific analysis and results.** **Instrument:** Oral presentation of research projects in the Senior Seminar (Physics 498) class**.** **Target** 80% of all students evaluated will have an overall score of good or better on the oral presentation. **Instrument:** Written summary of research projects in Senior Seminar (Physics 498). **Target** 80% of all students evaluated will have an overall score of 30/40 or better on the written abstract.

Program Student Learning Outcome 3	
Program Student Learning Outcome	Students will demonstrate a mastery of empirical methods via oral expression
Evaluation	Over the last three assessment cycles, we met our target every year. The program feels this is a valid assessment item; communicating sciences is an important skill for our graduates to master. However the program believes this is better combined with SLO 3: Students will develop a mastery of empirical methods via oral expression and retitled: Demonstrate effective oral and written communication of scientific analysis and results.
Measurement Instruments	Our analysis indicates the instrument was actually measuring the outcome. This instrument will continue to be used to help assess the new SLO of *Demonstrate effective oral and written communication of scientific analysis and results*. The associated rubric will be modified to clarify certain rubric scoring items.
Criteria & Targets	Criteria and targets were found to be valid and appropriate for the SLO and will not need to be changed.

Results & Conclusion	**Results**: The results are what we expected over the past 3 years. The results of this assessment are fed back to other courses where oral scientific communication is emphasized. **Conclusions**: The feedback from the assessment in Physics 498 back to other classes is showing positive results.
****IMPORTANT - Plans for Next Assessment Cycle**:	For the next assessment cycle, we will combine this SLO with SLO 3 and reword it as follows: **Demonstrate effective oral and written communication of scientific analysis and results.** **Instrument:** Oral presentation of research projects in the Senior Seminar (Physics 498) class. **Target** 80% of all students evaluated will have an overall score of good or better on the oral presentation. **Instrument:** Written summary of research projects in Senior Seminar (Physics 498). **Target** 80% of all students evaluated will have an overall score of 30/40 or better on the written abstract.

To add more outcomes, if needed, select the table above and copy & paste below.