Department of Physics and Astronomy
2013 Assessment Report: BS, BA, and BA (Teacher Preparation Concentration) in Physics

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1. ***As a result of last year's assessment effort, have you implemented any changes for your assessment including learning outcomes, assessment plan, assessment tools (methods, rubrics, curriculum map, or key assignment etc.), and/or the university baccalaureate learning goals?***

   We have not yet implemented any changes to our assessment plan, although we are in the early stages of developing a new plan based on our recent Program Review and the feedback we received from our 2011 – 12 Assessment Report. We have had some initial discussions regarding a more sustainable plan given our dramatic increase in the number of majors (>2x) in the past three years. We also need to address differences in our three degree programs.

   a. ***If so, what are those changes? How did you implement those changes?***
   b. ***How do you know if these changes have achieved the desired results?***
   c. ***If no, why not?***

   We recognize that we need to make some changes to the way that we do departmental level assessment. Our plan had been to finalize the plan for this academic year, but we faced several unexpected illnesses among our faculty that left us unable to complete the plan as desired. We expect to give the Major Field Test in physics (an exam produced by ETS in certain fields for assessment purposes: www.ets.org/mft) to our seniors beginning next Spring and to develop rubrics to more systematically measure outcomes in our Senior Project and Advanced Physics Laboratory course. We also plan on using the results from the Major Field Test to guide us to course-level assessment as needed. Given the small number of students enrolled in our upper division courses (typically < 15) our course-level assessments will take two or more offering cycles to develop meaningful statistics.

2. ***As a result of last year's assessment effort, have you implemented any other changes at the department, the college or the university, including advising, co-curriculum, budgeting and planning?***

   Yes.

   a. ***If so, what are those changes? How did you implement those changes?***
      We eliminated our unsuccessful Physical Science degree program. This was a languishing program that had very poor graduation rates. It was a degree that no longer served the purpose for which it was originally created (preparing secondary school teachers). Our Teacher Preparation Concentration has proven to be much more successful (as measured anecdotally by the rate at which the students were hired into the workforce as teachers). We also eliminated the Senior Project requirement for students in our BA programs – the two units that were previously required as a Senior Project have now been converted into upper-division major elective units, allowing increased flexibility for BA students and potentially decreasing time to graduation.
   b. ***How do you know if these changes have achieved the desired results?***
      In the long term, we expect our departmental graduation rate to increase as a result of both of these changes. The graduation rate of Physical Science was quite low and we had no data from the two

graduates of this program in the past decade to indicate that it was of any more value than a more specialized degree in any of the physical science disciplines would be. The dropping the Senior Project requirement for BA students allows more degree flexibility for those students who are clearly NOT on a graduate school trajectory.

c. If no, why not?

3. What PROGRAM learning outcome(s) have you assessed this academic year?

We measured Analytic Reasoning, Technical Skills, and Communication Skills. This year we did not collect any data on Physics Knowledge.

4. What method(s)/measure(s) have you used to collect the data?

We continued to collect and review Senior Projects and perform our Senior Exit Interviews. In the past, we have collected examples of student work from specific courses, but during this transition year – we did not.

5. What are the criteria and/or standards of performance for the program learning outcome?

We have an informal set of standards; we have evaluated the student work in a holistic fashion. We recognize the desire to develop formal rubrics for improved assessment purposes. It is our plan to develop such rubrics over the next academic year.

6. What data have you collected? What are the results and findings, including the percentage of students who meet each standard?

a. In what areas are students doing well and achieving the expectations?

In our review of Senior Projects papers and oral presentations, we find that all students meet what we would consider the minimum Communication Skills in our discipline. Students are able to not only describe and explain their work, but are also able to present the data in clear and concise manners (i.e. well produced tables, graphs, and other illustrations). In the Projects that were of an experimental nature, it was the opinion of the Committee that the Technical Skills objective was developed even more strongly than the Communication Skills. While it has proven difficult to measure, we also feel that the Analytic Reasoning of our graduates seem to have all exceeded our minimum standards. In previous years the Analytic Reasoning was assessed through a rigorous examination of individual student exemplar work from major theory courses, however due to the faculty illnesses noted above, the committee was not able to collect and study student work from these courses this cycle.

b. In what areas do students need improvement?

The weakest area was in the area of Communication Skills. While all of the writing was clear and understandable, in some cases it was not clear how clearly the authors' themselves understood what they were writing.

7. As a result of this year's assessment effort, do you anticipate or propose any changes for your program (e.g. structures, content, or learning outcomes)?

a. If so, what changes do you anticipate? How do you plan to implement those changes?

No, we do not anticipate any further <u>changes</u> to our program in the coming year. We need to study the outcome of the changes already made to assess their impact on students first. We will be institute significant changes to our method of assessment by formalizing our exiting assessment criteria into true

rubrics, focusing intensively on one or two learning outcomes each cycle and using the Major Field Test as an independent measure of student success in Physics Knowledge.

b. How do you know if these changes will achieve the desired results?

8. Which program learning outcome(s) do you plan to assess next year? How?

Hopefully we will be in a position to assess the Physics Knowledge of our students using the Major Field Test. We will also assess our Technical Skills and Communication Skills outcomes. We will not assess Analytical Reasoning in the next year so that we can focus our attention on the other outcomes and devise methods to improve the assessment of Analytical Reasoning in a more formal manner.