I. Brief Summary of Assessment Proposal

The Department of Physics and Astronomy has identified five learning outcomes:

1) Graduates will master a broad set of physical principles that form the basis of the physics discipline (topics include classical mechanics, electromagnetism, quantum mechanics, and statistical mechanics)

2) Graduates will be able to apply the computational and mathematical tools required to analyze and solve physics problems and experiments.

3) Graduates will be able to design, implement, analyze & evaluate experiments demonstrating a broad range of physical principles.

4) Graduates will be able to apply the tools & content learned in their Physics courses to complex & unique real world problems.

5) Graduates will be able comprehend scientific data and to produce scientific writing and to orally present scientific data and other scientific information.

In our assessment proposal, we identified two areas of concern:

a) Evaluating how well the lower division courses prepare students for upper division course work (outcome 1).
b) Evaluating the upper division writing program and how it can be used to assess outcome 5.

We proposed to convene two subcommittees to address these issues.

II. Current Accomplishments

1) We convened a working group to develop a collection of exam problems for the core upper division physics courses that have the following characteristics:

a) They directly focus on a lower division concept that appears in a significant fraction of upper division problems.
b) They are graded on a simple 0 – 2 point scale for easy comparison.
c) They are a natural part of the final exam of the course.

The plan is to compile statistics on the scores earned by students on these problems to identify potential gaps in lower division training. By embedding them in the final exam process, we expect to minimize additional grading and analysis work. We have already piloted this in the two core courses taught in Fall 2010. We have established that faculty are very willing to include the problems, have the grading done according to our specifications, and report the scores for later analysis.

2) We convened a separate group to analyze our upper division writing, which was essentially a Senior Thesis project. In addition, we have included our upper division

writing work from 2009 – 2010 in the regular review of upper division writing. The initial review by our group has produced a proposal for a reformatting of our upper division writing requirement that is better aligned with our stated outcomes and will provide for a more streamlined assessment plan. The new writing requirement would allow for multiple writing samples to be randomly collected in portfolios and used to assess outcome 5. Currently, we have only a single writing piece – the final senior thesis or project – to use for assessment.

III. Future steps

1) With regard to the use of exams in courses, we will continue to pilot questions throughout the year and convene the group in the summer of 2011 to evaluate the results from the first year. We have a unique opportunity to evaluate our ability to assess the impact of lower division courses in the following sense. We gave the assessment question in Upper Division Statistical Physics, which currently is our only core course for which students do not receive explicit training in the lower division curriculum. Next year, we are introducing a new lower division course to better prepare students for this class. It will be very interesting to see if we observe any change in the performance on the assessment question.

2) For the writing evaluation, we have received the approval of our proposed changes to the writing requirements, but are still awaiting the final results of the summer evaluation of our upper division writing. Over the summer, these results will be used by the instructor for the new writing course to integrate in assessment.