

Departmental and Program Assessment Annual Assessment Plan Report

Academic Year: 2007-2008

Academic Department or Program: **Physics**

Chair: **Ann Wright**

Assessment Plan

- Is there an assessment plan for your department or program? (It should be on the web at <http://www.hendrix.edu/academics/academics.aspx?id=7264>. If not, explain when one will be completed.)

Yes

- Does the assessment plan include stated student learning goals? (If so, then copy or attach them. Goals should be able to stand alone as a list without pages of explanatory commentary. If not, explain when a list of student learning goals will be available.)

Yes. The goals are:

- 1. To provide science and non-science students with an introduction to both the methodology of the physical sciences and the major models of reality developed in the physical sciences.**
 - **To provide all students with opportunities to understand and practice the methodology of the physical sciences.**
 - **To provide students with a grasp of the historical development of models of the physical world, the experimental basis of these models, and how these models have impacted how humanity views reality.**
- 2. To provide Biology, Chemistry, Physical Chemistry, Biochemistry/Molecular Biology and Mathematics students with the background in theoretical and applied physics necessary for their chosen field of academic specialization.**
 - **Biologists and Chemists need to understand the physical laws of mechanics, electrodynamics, thermodynamics, and atomic physics that are crucial to their disciplines.**
 - **Mathematicians need to see how mathematics is applied to the description of natural phenomena.**
- 3. To provide physics majors with an in-depth study in the field of physics. Including:**

- **A clear understanding of the experimental basis of all fundamental physical theories. They should understand the major theories and be able to explain how they follow from experimental results.**
 - **A panoramic view of the field of physics with enough detail to enable them to easily make connections with new information in physics, and thereby more readily assimilate new information.**
 - **Undergraduate research. We feel that students don't really understand the nature of the field of physics until they have practiced it, reported their results at a meeting involving students from other institutions, and compared the quality of their work with that of students at other institutions. Since we consider ourselves a national liberal arts college, this comparison should be at the national level.**
- Does the assessment plan include a list of assessment data that are collected each year? (If so, then copy or attach the list. Assessment data lists should be able to stand alone as a list without pages of explanatory commentary. If not, explain when a list of assessments will be available. You do *not* need to submit any of your data, but it should be on file in your department.)

Yes. The data collected each year include:

- 1. course syllabi are maintained for all courses offered**
- 2. samples of final examinations, laboratory reports, and student papers are maintained,**
- 3. grades assigned to students,**
- 4. student evaluations of course content and value,**
- 5. senior comprehensive examination,**
- 6. student presentations at national meetings,**
- 7. Exit interviews**
- 8. success of graduates in obtaining graduate school acceptances, assistantships, or employment.**
- 9. student performance on standardized tests such as MCATs and GRE Physics test.**

- Has your department or program done an assessment audit of your courses to determine how course goals match overall student learning goals? (This has not been required of departments, but it is a recommended exercise that was explained at the most recent chairs' assessment workshop. If you have done this, please report the results.)

No. We plan to meet during the summer of 2008 to do this.

- Are department or program student learning goals available to students? Are student learning goals included in course syllabi in your department or program?

Yes. Department goals are posted on the web at

<http://www.hendrix.edu/academics/academics.aspx?id=7264>. Student goals are included in course syllabi for all courses in the Physics Department.

Student Assessments

- Describe which *direct* assessments in your assessment plan have been collected for the year and which have not. [“Direct” refers to evaluated student work.]

Collected:

- 1. course syllabi for all courses offered**
- 2. samples of final examinations, laboratory reports, and student papers are maintained,**
- 3. grades assigned to students,**
- 4. senior comprehensive examination,**
- 5. student presentations at national meetings,**
- 6. success of graduates in obtaining graduate school acceptances, assistantships, or employment.**
- 7. student performance on standardized tests such as MCATs and GRE Physics test.**

Not collected:

none

- Describe which *indirect* assessments in your assessment plan have been collected for the year and which have not. [“Indirect” refers to student surveys or opinions.]

Collected:

- **student evaluations of course content and value,**

Not collected:

- **Exit interviews**

Assessment Planning

- How is information about student learning shared and used for department or program decision making? (Each department and program is expected to have discussions of at least two hours each academic year to discuss assessment. If you have met, briefly summarize the meeting. If you have not met, when do you plan to meet?)

We discussed the following assessment issues during department meetings in the 07-08 academic year:

- 1) Discussion of course goals listing in syllabus. Adding course goals that mirror the student assessment goals.
- 2) (assessment goal #1) Do we need to add a lab component to Astronomy to better serve the non-science majors of Hendrix College. Result: new course has been added for 10 students for a trial run in Fall 2008. The lab exercises are being developed by student Ryan Strickland as a Special Projects Odyssey project.
- 3) (assessment goal #3) Modify pre-requisites for upper level courses? Some students are having trouble fitting all four upper level courses into their schedule because $\frac{3}{4}$ are offered every other year. By allowing students to take Modern Physics and Thermodynamics before they complete Waves and Vibrations, the problem is greatly reduced. These curriculum changes will be submitted in Fall 2008: remove PHYS 305 as pre-req for PHYS 315 and PHYS 370. Make PHYS 305 a co-req instead of a pre-req for PHYS 380. Change pre-req for PHYS 330 to PHYS 315 or CHEM 310.
- 4) (assessment goal #2) Modified the pre-requisites for PHYS 210 and 220 to now include a math pre-requisite of MATH 120 or higher. Some students were struggling in these classes due to lack of basic math skills. These curriculum changes were approved for start in 2008-09 academic year.
- 5) (assessment goal #2) Wrote learning objectives for General Physics lab. Modified the lab report policy from 8 full lab reports to four lab reports and 5 one page summary sheets plus data. The learning objectives are:
 - a) Synthesize the physics in each lab.
 - b) Write coherent technical reports
 - c) Learn proper experimental techniques.
 - d) Gain experience with equipment common to physics research.

We plan to meet for a day-long department meeting in June 2008. The purpose of this meeting will be to rewrite our short and long term goals for the department now that the two new faculty members have been in the department for one full year.

- Describe any curricular or other programmatic changes that have been made that were based (at least in part) on the availability of your assessment data.
- 1) Added PHYS 161 Astronomy with lab. New course for 10 students for a trial run in Fall 2008. The lab exercises are being developed by student Ryan Strickland as a Special Projects Odyssey project.
 - 2) Modified the pre-requisites for PHYS 210 and 220 to now include a math pre-requisite of MATH 120 or higher. Some students were struggling in these classes due to lack of basic math skills. These curriculum changes were approved for start in 2008-09 academic year.

- 3) **Wrote learning objectives for General Physics lab. Modified the lab report policy from 8 full lab reports to four lab reports and 5 one page summary sheets plus data. The learning objectives are:**
- i) **Synthesize the physics in each lab.**
 - ii) **Write coherent technical reports**
 - iii) **Learn proper experimental techniques.**
 - iv) **Gain experience with equipment common to physics research.**
- Describe any changes in the Assessment Plan that have been made during this academic year. (If changes have been made, please submit an electronic copy of the revised plan to Amanda Hurd.)

None. We plan to revise our assessment plan during the June 2008 department meeting.

- Define at least one action item for your group that will be a goal of your assessment discussions next year?
- 1) **(assessment goal #3) Modify pre-requisites for upper level courses? Some students are having trouble fitting all four upper level courses into their schedule because $\frac{3}{4}$ are offered every other year. By allowing students to take Modern Physics and Thermodynamics before they complete Waves and Vibrations, the problem is greatly reduced. These curriculum changes will be submitted in Fall 2008: remove PHYS 305 as pre-req for PHYS 315 and PHYS 370. Make PHYS 305 a co-req instead of a pre-req for PHYS 380. Change pre-req for PHYS 330 to PHYS 315 or CHEM 310.**
 - 2) **(assessment goal #2) Discuss the possibility of moving General Physics courses to a studio format.**
 - 3) **(assessment goal #2) Assess the content of the General Physics courses.**
 - 4) **(assessment goal #1) Development of a new natural science course on the topic of alternative energies and sustainability.**