Weber State University
Annual Assessment of Evidence of Learning

Cover Page

Department/Program: PHYSICS
Academic Year of Report: 2013/2014
Date Submitted:
Report author: Colin Inglefield (Department Chair)

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    Email: cinglefield@weber.edu
A. **Brief Introductory Statement:**

Please review the Introductory Statement and contact information for your department displayed on the assessment site: [http://www.weber.edu/portfolio/departments.html](http://www.weber.edu/portfolio/departments.html) - if this information is current, please indicate as much. No further information is needed. We will indicate “Last Reviewed: [current date]” on the page.

If the information is not current, please provide an update:

Information is current at
http://www.weber.edu/portfolio/physics.html
B. Mission Statement

Please review the Mission Statement for your department displayed on the assessment site:
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If the information is not current, please provide an update:

Information is current at
http://www.weber.edu/portfolio/physics.html
C. Student Learning Outcomes
Please review the Student Learning Outcomes for your department displayed on the assessment site: 
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If they are not current, please provide an update:

  Information is current at 
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D. Curriculum
Please review the Curriculum Grid for your department displayed on the assessment site: http://www.weber.edu/portfolio/departments.html - if it is current, please indicate as much; we will mark the web page as “Last Reviewed: [current data]”. No further information is needed.
If the curriculum grid is not current, please provide an update:

Information is current at
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E. Assessment Plan
Please review the Assessment Plan for your department displayed on the assessment site:
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If the plan is not current, please provide an update:

Update to General Education Employment plan:
In April 2014 the department adopted the following plan for Gen. Ed. Assessment. Implementation began this semester (Fall 2014) with all the instructors for the general education (PS) classes participating. The group decided to focus on Natural Science Outcome #4 and Physical Science Outcome #4 for Fall 2014. The group has met for discussion three times and evidence has been gathered for those outcomes across all of our PS courses.

The author of this report is chairing the PS General Education group for the University General Education committee this year and has shared this plan with the group.

PLAN:

Physics Department General Education Assessment Strategy
2014-15
(Approved in April 2014)

The Department of Physics is devoted to providing an education for all students and towards scientific literacy that prepares individuals for both professional goals and the responsibilities of citizenry. Many of these goals are inherent in the General Education outcomes created by university faculty and approved by our faculty senate. However, we are taking on an experiment to try to develop more authentic and meaningful evaluations of these outcomes than we’ve seen modeled for us thus far. Our process will be as follows:

1. For a given academic year, individual instructors involved in General Education instruction (PHYS 1010, 1040, 1360, 2010, 2210; HNRS 1500; and other future courses as approved) will assemble and select two learning
outcomes, one from the “Foundations of Natural Sciences” list and one from the “Physical Sciences” list (see below; or http://www.weber.edu/academicaffairs/natural_sciences.html).

2. Collaborating instructors will first share what they already do to assess such outcomes, whether these be formalized on standard assignments or part of other formative assessments (course discussions, student interviews, etc.).

3. Instructors will collaborate on how to further develop these strategies and/or brainstorm on other assessment strategies. These should be varied, as appropriate for a given learning outcome.

4. Instructors will collaboratively plan how they can document the evaluation of these assessments, to be included in the Department’s annual report and other assessment documents.

An overarching objective is to create a strategy that gives instructors more useful information about their students’ learning than a percentage of correct answers on a test. For example, a one-paragraph essay at the end of a class session may tell us more about the nature of student learning and instructional needs than a quantitative answer to a problem. Or, instructors may find a way to diagnose student difficulties by documenting conversations with small samples of students in lab settings. Or, a class session may utilize an in-class survey that is designed to gauge understanding of how evidence refutes an explanation. Or, instructors could document the occurrences of specific categorical flaws in students’ analysis of forces on a test problem. There are limitless possibilities.

Our hope is that these efforts will become more than just a spreadsheet of percentages, but information that we can use in our courses. Additionally, this gives us the chance to collaborate (something we naturally do anyway) and focus on reasonable chunks that can generate helpful information for both ourselves and our students.
Foundations of the Natural Sciences  Learning Outcomes

After completing the natural sciences general education requirements, students will demonstrate their understanding of general principles of science:

1. **Nature of science.** Scientific knowledge is based on evidence that is repeatedly examined, and can change with new information. Scientific explanations differ fundamentally from those that are not scientific.
2. **Integration of science.** All natural phenomena are interrelated and share basic organizational principles. Scientific explanations obtained from different disciplines should be cohesive and integrated.
3. **Science and society.** The study of science provides explanations that have significant impact on society, including technological advancements, improvement of human life, and better understanding of human and other influences on the earth’s environment.
4. **Problem solving and data analysis.** Science relies on empirical data, and such data must be analyzed, interpreted, and generalized in a rigorous manner.

The Physical Sciences  Learning Outcomes

Students will demonstrate their understanding of the following feature of the physical world:

1. **Organization of systems:** The universe is scientifically understandable in terms of interconnected systems. The systems evolve over time according to basic physical laws.
2. **Matter:** Matter comprises an important component of the universe, and has physical properties that can be described over a range of scales.
3. **Energy:** Interactions within the universe can be described in terms of energy exchange and conservation.
4. **Forces:** Equilibrium and change are determined by forces acting at all organizational levels.
F. Report of assessment results for the most previous academic year:

This past year we collected artifacts from our upper-division courses for the NW accreditation process. We collected examples of “exemplary” and “typical” student work from 3 courses: PHYS 3540, *Mechanical and Electromagnetic Waves*, PHYS 3180, *Thermal Physics*, and PHYS 4400, *Advanced Physics Laboratory*. This was an excellent opportunity for us as a department to compare courses and determine if standards were consistent across our upper-division curriculum. We determined that they were.
Appendix B

Please provide the following information about the full-time and adjunct faculty contracted by your department during the last academic year (summer through spring). Gathering this information each year will help with the headcount reporting that must be done for the final Five Year Program Review document that is shared with the State Board of Regents.

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Headcount</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)</td>
<td>13</td>
</tr>
<tr>
<td>Full-time Tenured</td>
<td>9</td>
</tr>
<tr>
<td>Full-time Non-Tenured (includes tenure-track)</td>
<td>1</td>
</tr>
<tr>
<td>Part-time</td>
<td>3</td>
</tr>
<tr>
<td>With Master's Degrees</td>
<td></td>
</tr>
<tr>
<td>Full-time Tenured</td>
<td></td>
</tr>
<tr>
<td>Full-time Non-Tenured</td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td>3</td>
</tr>
<tr>
<td>With Bachelor's Degrees</td>
<td></td>
</tr>
<tr>
<td>Full-time Tenured</td>
<td></td>
</tr>
<tr>
<td>Full-time Non-tenured</td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Full-time Tenured</td>
<td></td>
</tr>
<tr>
<td>Full-time Non-tenured</td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td></td>
</tr>
<tr>
<td>Total Headcount Faculty</td>
<td>17</td>
</tr>
<tr>
<td>Full-time Tenured</td>
<td>9</td>
</tr>
<tr>
<td>Full-time Non-tenured</td>
<td>1</td>
</tr>
<tr>
<td>Part-time</td>
<td>7</td>
</tr>
</tbody>
</table>
Please respond to the following questions.

1) Reflecting on this year’s assessment(s), how does the evidence of student learning impact your faculty’s confidence in the program being reviewed; how does that analysis change when compared with previous assessment evidence?

In the previous year, we reviewed several general education (PS) courses for the university general assessment plan. We determined that the material being taught and evaluated was matched to the PS learning outcomes. Not surprising, as our courses are somewhat traditional in this regard. Our hope is that the new general education plan we’ve adopted will result in a more significant assessment, in terms of our own internal discussions and sharing of results and ideas within the department. So far, we have had some success in this regard.

2) With whom did you share the results of the year’s assessment efforts?

This report will be shared within the department and with the Dean. The department’s new general education assessment plan was shared with the university general education PS working group.

3) Based on your program’s assessment findings, what subsequent action will your program take?

We continue to try and develop an assessment plan that is substantive and efficient. Our new general education document is a step in this direction. We are working to modify plans for the other parts of our program as well. We will continue the strategic planning process started last year by request of the dean.