

University of Louisiana at Lafayette

Detailed Assessment Report 2015-2016 Physics BS

As of: 11/17/2016 11:49 AM CENTRAL

(Includes those Action Plans with Budget Amounts marked *One-Time, Recurring, No Request.*)

Mission / Purpose

The mission for the Bachelor's of Science degree in Physics is to produce students who are well rounded, scientific thinkers. In order to ensure this goal, we are implementing assessment tools to determine how well students are prepared in a few key areas: fundamental laws of physics, how well students assimilate physics material, communication and technical skills.

Student Learning Outcomes/Objectives, with Any Associations and Related Measures, Targets, Findings, and Action Plans

SLO 1: Fundamental Physical Laws

All candidates for the B.S. Degree in Physics will be able to demonstrate knowledge of fundamental physical laws and ability to apply them to the solution of practical problems in physics and related fields.

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Related Measures

M 1: Final Exam Embedded Questions

Each candidate's knowledge is evaluated by their ability to answer a consistent (GRE-Physics type) content-related question, which will be embedded into a final exam for all 300-level and 400-level courses (excluding Phys 491, 492, 497,498) required by the B.S. Program curriculum. Number of students assessed = All

Source of Evidence: Writing exam to assure certain proficiency level

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Target:

At least 70% of students enrolled in a course will answer a consistent embedded question correctly.

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Finding (2015-2016) - Target: Partially Met

In the Fall of 2015, one physics major was enrolled in PHYS 301 (Modern Physics). On the embedded test question the student received an 18/20 = 90%. In the Fall of 2015, five physics majors were enrolled in PHYS 437 (Quantum Mechanics I). On the selected question, their scores were 6/10, 9/10, 10/10, 6/10, and 4/10, giving them an average score of 70%. Only one of the five answered the question correctly if correctly is defined as without error, while two answered at an A level, and four answered at a passing level.

In the Spring of 2016, the only course that was taught by a faculty member at

the University of Louisiana at Lafayette which meets the criteria for the Final Exam Embedded Questions regarding Fundamental Physical Laws was PHYS 438 (Quantum Mechanics II). On the selected question, 60% of the students correctly answered the embedded question.

Related Action Plans (by Established cycle, then alpha):

Modify Expectation for Success

Adapt a passing score of 70% average. The passing score for each student will be compiled for each course required by the B.S. curriculum (usually each course is offered once a year) with the notation "pass" made if a student answers a question correctly.

Established in Cycle: 2009-2010

Implementation Status: Planned

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Final Exam Embedded Questions |

Outcome/Objective: Fundamental Physical Laws

Continued Evaluation

As only three students were evaluated in this cycle, this was an incidence of low statistics. We will continue evaluating this particular class in the future.

Established in Cycle: 2014-2015

Implementation Status: Planned

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Final Exam Embedded Questions |

Outcome/Objective: Fundamental Physical Laws

2015-2016

We are continuing with our action plan from previous cycles without alteration. Our outcomes do not seem to warrant large alterations, and we will continue to monitor the success of our students in relation to our previous plans.

Established in Cycle: 2015-2016

Implementation Status: Planned

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Final Exam Embedded Questions |

Outcome/Objective: Fundamental Physical Laws

Measure: Presentation skills | **Outcome/Objective:** Communication

Measure: Research project | **Outcome/Objective:** Skills

Measure: seminar | **Outcome/Objective:** Assimilation of new scientific information

SLO 2: Assimilation of new scientific information

All candidates for the B.S. Degree in Physics will be able to evaluate and assimilate new scientific information from scientific journals, books, and web-resources

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Related Measures

M 2: seminar

Each candidate is required to review scientific findings on a particular research topic and deliver the presentation at the departmental seminar during the first semester of his/her senior year. The committee of three faculty members evaluates the

candidate's understanding of presented scientific information by asking questions and completing student's seminar evaluation forms. Number of students assessed = All

Source of Evidence: Presentation, either individual or group

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Target:

The outcome will be measured during the senior year when student is enrolled in Phys491. To achieve a goal, a full 100% of students will attain at least 70% average of the maximum score on the content part of the evaluation form

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Finding (2015-2016) - Target: Met

In Fall 2015, two students were enrolled in Phys491 and were evaluated by the faculty committee. The average scores on the research content part of the evaluation metrics are: student 1- 75%, student 2-96%.

During the Spring 2016 semester, four students were enrolled in PHYS 492 and were evaluated by the faculty committee. The average scores for the students were: student 1: 81%, student 2: 72%, student 3: 90%, and student 4: 77%.

Related Action Plans (by Established cycle, then alpha):

Changed criteria for "success"

Adapt a passing score of 70% average

Established in Cycle: 2009-2010

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: seminar | **Outcome/Objective:** Assimilation of new scientific information

Committee feedback

Complete evaluation rubric and comments from all three faculty members are provided to a student and his adviser for review and use for taking improvement actions.

Established in Cycle: 2012-2013

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: seminar | **Outcome/Objective:** Assimilation of new scientific information

2015-2016

We are continuing with our action plan from previous cycles without alteration. Our outcomes do not seem to warrant large alterations, and we will continue to monitor the success of our students in relation to our previous plans.

Established in Cycle: 2015-2016

Implementation Status: Planned

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Final Exam Embedded Questions |

Outcome/Objective: Fundamental Physical Laws

Measure: Presentation skills | **Outcome/Objective:** Communication

Measure: Research project | **Outcome/Objective:** Skills

Measure: seminar | **Outcome/Objective:** Assimilation of new scientific information

SLO 3: Communication

All candidates for the B.S. Degree in Physics will be able to communicate scientific/professional ideas both orally and in writing

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Related Measures

M 3: Presentation skills

Each candidate will deliver at least two research seminars during their Senior Year, which will be evaluated independently by the committee of three faculty members by completing student's seminar evaluation forms. Each student evaluation form will contain special section evaluating student's ability to communicate scientific/professional ideas both orally and in writing

Source of Evidence: Presentation, either individual or group

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Target:

The outcome will be measured at the end of each student educational period (senior status) when student is enrolled in Phys491 or 492. To achieve a goal, a full 100% of students will attain at least 70% average of the maximum score on the presentation part of the evaluation form.

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Finding (2015-2016) - Target: Partially Met

In the Fall of 2015 two students were enrolled in PHYS 491. On the presentation skills portion of the seminar, student 1 received a 96% and student 2 received a 98%.

In the Spring of 2016 four students were enrolled in PHYS 492. On the presentation skills portion of the seminar, student 1 received a 74%, student 2 received an 84%, student 3 received a 62%, and student 4 received a 75%.

Related Action Plans (by Established cycle, then alpha):

Changed criteria for "success"

Adapt a passing score of 70% average.

Established in Cycle: 2009-2010

Implementation Status: Planned

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Presentation skills | **Outcome/Objective:** Communication

Tracked student improvement

Student's improvement will be tracked as they progress from Phys 497/491 to Phys 498/492. They will be expected to reach learning outcomes expectations in the second semester of research project.

Established in Cycle: 2012-2013

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Presentation skills | **Outcome/Objective:**
Communication

2015-2016

We are continuing with our action plan from previous cycles without alteration. Our outcomes do not seem to warrant large alterations, and we will continue to monitor the success of our students in relation to our previous plans.

Established in Cycle: 2015-2016

Implementation Status: Planned

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Final Exam Embedded Questions |

Outcome/Objective: Fundamental Physical Laws

Measure: Presentation skills | **Outcome/Objective:**
Communication

Measure: Research project | **Outcome/Objective:** Skills

Measure: seminar | **Outcome/Objective:** Assimilation of new scientific information

SLO 4: Skills

All candidates for the B.S. Degree in Physics will have strong independent-learning, analytical, and problem-solving skills for advanced graduate studies in physics or related discipline and/or for careers in science, engineering, and industry.

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Related Measures

M 4: Research project

All students are required to enroll and successfully complete Phys498 (Senior Research II) that involves an independent research project under a faculty member supervision during their Senior year. The research results are reported at the departmental seminar (during the second-semester of the Senior Year) and evaluated by the committee of three faculty members by completing advanced student's seminar evaluation forms that reflect on candidate's understanding of the nature of the research project, current state of knowledge in a particular research area, as well as candidate's skills to produce innovative research results using appropriate physical/mathematical knowledge. Number of students assessed = All

Source of Evidence: Project, either individual or group

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[Report2010_2011](#)

Target:

The outcome will be measured during the senior year when a student is enrolled in Phys492. To achieve a goal, full 100% of students will attain at least 70% average of the maximum score on the content part of the advanced-research project evaluation form.

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[Report2010_2011](#)

Finding (2015-2016) - Target: Met

In Fall 2015, two students were enrolled in Phys491 and were evaluated by the faculty committee. The average scores on the research content part of the

evaluation metrics are: student 1- 75%, student 2-96%.

In the Spring 2016 semester four students were enrolled in PHYS 492 and were evaluated by the faculty committee. On the research content portion of the evaluation metric, the student scores were: student 1 79%, student 2 93%, student 3 79%, and student 4 86%.

Related Action Plans (by Established cycle, then alpha):

Altered pedagogy

Students will receive grades in Phys491 and Phys492 strongly tangible to their evaluation results (vs prior policy when grades were based on attendance/participation) . The evaluation committee will provide the feedback form to a student and her/his research advisor on the quality of the scientific project presented.

Established in Cycle: 2009-2010

Implementation Status: Planned

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Research project | **Outcome/Objective:** Skills

Tracked progress

We implemented an action item to provide the faculty committee feedback to a student and his adviser after a student has completed his first semester research and presentation. The effect on student improvements will be tracked for several semesters. If improvements are not shown, we will consider additional action items.

Established in Cycle: 2012-2013

Implementation Status: Finished

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Research project | **Outcome/Objective:** Skills

2015-2016

We are continuing with our action plan from previous cycles without alteration. Our outcomes do not seem to warrant large alterations, and we will continue to monitor the success of our students in relation to our previous plans.

Established in Cycle: 2015-2016

Implementation Status: Planned

Priority: High

Relationships (Measure | Outcome/Objective):

Measure: Final Exam Embedded Questions |

Outcome/Objective: Fundamental Physical Laws

Measure: Presentation skills | **Outcome/Objective:** Communication

Measure: Research project | **Outcome/Objective:** Skills

Measure: seminar | **Outcome/Objective:** Assimilation of new scientific information

Analysis Questions and Analysis Answers

How were assessment results shared and evaluated within the unit?

The assessment results will be shared at departmental meetings. The Physics Department as a whole will then be able to discuss any changes we would like to implement as a group.

Identify which action plans [created in prior cycle(s)] were implemented in this current cycle. For each of these implemented plans, were there any measurable or perceivable effects? How, if at all, did the findings appear to be affected by the implemented action plan?

We are continuing with our previous action plan which assesses students via seminar performance and how they perform on GRE style questions put into examinations during their coursework. These types of metrics are a standard means of assessing our students current status, as well as creating a vehicle for measuring their readiness for possible graduate studies.

What has the unit learned from the current assessment cycle? What is working well, and what is working less well in achieving desired outcomes?

From the current cycle we see that the level of seminar performance, although adequate, can be improved. We will make certain to work more closely with students regarding what the expectations are for their presentations.