**STUDENT LEARNING ASSESSMENT PROGRAM**
**SUMMARY FORM AY 2004-2005**

<table>
<thead>
<tr>
<th>Degree and Program Name:</th>
<th>Science with Teacher Certification, Concentration in Physics</th>
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<tr>
<td>Submitted By:</td>
<td>Dr. Leonard E. Storm</td>
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**PART ONE**

<table>
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<tr>
<th>What are the learning objectives?</th>
<th>How, where, and when are they assessed?</th>
<th>What are the expectations?</th>
<th>What are the results?</th>
<th>Committee/ person responsible? How are results shared?</th>
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<tr>
<td>1. Demonstrate a working knowledge of the basic laws of physics in the areas of mechanics, electromagnetism, thermodynamics, and modern physics.</td>
<td>Indirect measures: 1a. Course evaluation questionnaire given at the end of each course in the major.</td>
<td>1a. On the scale 2=strongly agree to -2=strongly disagree, the expectation is that the average would be greater than zero.</td>
<td>1a. The questionnaires were first given Spring 2005. “This course has increased my ability to assess and solve real physics problems.” Response average = 0.75 based upon 76 students. “This course has given me a solid, working knowledge of the areas of physics covered in this course.” Response average = 0.61 based upon 76 students.</td>
<td>The Assessment Committee is responsible for analyzing and updating assessment tools and for analyzing data and reporting the results to the Physics Department and to the Curriculum Committee for possible revision of the curriculum. Instructors are responsible for collecting course evaluation questionnaires from each of their courses in the major. The Physics Seminar instructor will be responsible for performing a primary trait analysis of student talks and administering the...</td>
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1b. Exit interview questionnaire.

Direct measures:
1c. GRE or ETS Major Field Exam given during Physics Seminar.
1d. Illinois Teacher Certification content Test in Physical Sciences

1b. On the scale 2=strongly agree to -2=strongly disagree, the expectation is that the average would be greater than zero.

1c. No data.
1d. >80% should pass the exam with the average institution score on subareas 5 & 6 greater than or equal to the state average.
(5:Motion,Forces,&Waves) (6:Heat,Elec.,Mag.&Modern)

1b. Question: The Physics program at EIU has given me an appropriate background in:

- Mechanics
  - 10 Responses, Ave=1.0
- E&M
  - 10 Responses, Ave=0.80
- Thermodynamics
  - 10 Responses, Ave=0.70
- Quantum Mechanics
  - 10 Responses, Ave=0.70

1c. No data.
1d. Spring 2005, 100% (all 3) passed the exam.

ETS Major Field Exam or GRE.

The Lab Practicum instructor will be responsible for doing a primary trait analysis of a lab report and a presentation.
2. Students will be able to perform physics experiments appropriate for the high school level and analyze them using appropriate mathematical techniques.

<table>
<thead>
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<th>Indirect measures:</th>
<th>Direct measures:</th>
<th>Indirect measures:</th>
<th>See under 1.</th>
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</table>
| 2a. Course evaluation questionnaire given at the end of each laboratory course in the major. | 2a. On the scale 2=strongly agree to -2=strongly disagree, the expectation is that the average would be greater than zero. | 2a. The questionnaires were first given Spring 2005.  
“This course increased my ability to use basic experimental apparatus to study physical phenomena.”  
Response average =1.21 based upon 28 students.  
“This course helped me to understand how to use error analysis techniques.”  
Average response = 1.09 based upon 33 responses. | |
| 2b. Exit interview questionnaire.  | 2b. On the scale 2=strongly agree to -2=strongly disagree, the expectation is that the average would be greater than zero. | 2b. Question: The Physics program at EIU has given me the ability to:  
calculate the experimental error in real physical situations.  
Responses=10. Ave.=1.00 | |
| Direct measures:                   | 2c. Development of a rubric is in progress. | 2c. Development of a rubric is in progress. | |
| 2c. Primary trait analysis of a lab submitted during PHY 3500. | | | |
3. Demonstrate a proficiency in applying mathematics up to and including: Calculus III.

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<tr>
<th>Indirect measures:</th>
<th>3a. Course evaluation questionnaire given at the end of each course in the major.</th>
<th>3a. On the scale 2=strongly agree to -2=strongly disagree, the expectation is that the average would be greater than zero.</th>
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<td>3b. Exit interview questionnaire.</td>
<td>3b. On the scale 2=strongly agree to -2=strongly disagree, the expectation is that the average would be greater than zero.</td>
<td>3b. Question: The Physics program at EIU has given me the ability to: use mathematics in the solution of real physics problems. Responses=10. Ave.=1.20</td>
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<td>Direct measures:</td>
<td>3c. GRE or ETS Major Field Exam with supplemental math questions.</td>
<td>3c. No data yet.</td>
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3a. The questionnaires were first given Spring 2005. “This course has increased my ability to use mathematics to solve physical problems.” 76 responses with an average rating of 0.68.

3b. Question: The Physics program at EIU has given me the ability to:
use mathematics in the solution of real physics problems.
Responses=10. Ave.=1.20
| 4. Students will demonstrate the ability to communicate technical material effectively in speaking and writing. | Indirect measures:  
4a. Course evaluation questionnaire given at the end of each laboratory course in the major. | 4a. On the scale 2=strongly agree to -2=strongly disagree, the expectation is that the average would be greater than zero. | 4a. The questionnaires were first given Spring 2005.  
“This course increased my ability to produce clearly written lab reports.”  29 responses with an average score of 0.86. | See under 1. |
| --- | --- | --- | --- | --- |
| 4b. Exit interview questionnaire. | 4b. On the scale 2=strongly agree to -2=strongly disagree, the expectation is that the average would be greater than zero. | 4b. Question: The Physics program at EIU has given me the ability to communicate effectively, both verbally and in writing.  
Responses=10. Ave.=0.80. | 4. Direct measures:  
4c. Primary trait analysis of a presentation given in Physics seminar.  
4d. Primary trait analysis of a presentation given in PHY 3500. | 4c. Rubric in preparation.  
4d. Rubric in preparation. |

**PART TWO**

Describe what your program’s assessment accomplishments since your last report was submitted. Discuss ways in which you have responded to the CASA Director’s comments on last year’s report or simply describe what assessment work was initiated, continued, or completed.

Since the last report, the Physics assessment committee was enlarged from 1 person to 3. Course evaluation questionnaires and Exit Interview questionnaires were developed and data collected to obtain indirect measures of student learning at intermediate points in the program. Sample GRE Physics exams were given to students in the Physics Seminar Course to obtain a direct measure of student learning. Rubrics are being developed for PHY 3500 and Physics Seminar. The assessment committee met with the CASA Director for the purpose of evaluating the Department’s proposed assessment tools.
PART THREE

Summarize changes and improvements in curriculum, instruction, and learning that have resulted from the implementation of your assessment program. How have you used the data? What have you learned? In light of what you have learned through your assessment efforts this year and in past years, what are your plans for the future?

The following questions were included in the course evaluations:

Course evaluation question: “Three hours of lecture per week were sufficient to cover all of the topics required by the course syllabus.” On a scale of 2=strongly agree to -2=strongly disagree, the average from each course in the major during spring 2005 was {0.17, 0.66, 0.14, 1.00, 1.50, -0.15, 0.00} resulting in an average of 0.45.

Course evaluation question: “The amount of time spent discussing homework each week was adequate.” On a scale of 2=strongly agree to -2=strongly disagree, the average from each course in the major during spring 2005 was {-0.33, 0.39, -0.43, 1.25, 1.50, -0.58, 2.00} resulting in an average of 0.18.

Instructors who received a negative average will be notified. The department is also waiting on the recommendations of a CUR external review of the program. Based upon these results, the assessment committee will look into restructuring lecture, homework, and lab hours for certain courses.

Some responses to the questionnaires indicate that some questions need to be revised to reduce confusion. Exit interview questions should be more tailored to the individual program options. Course evaluation questions may need to be course specific.

Rubrics are being designed for the Lab Practicum course and the Seminar course.