DEPARTMENT: Physics   **DATE:**   5/8/2014

PROGRAM(S) COVERED IN REVIEW: Physics, Bachelor of Science.

COMMITTEE MEMBER(S) CONDUCTING REVIEW: Shari Nelson, Kevin Buettner, & Brett Johnson

1. STUDENT LEARNING GOALS

- Were any goals referenced?   YES ✔   NO____   QUALIFIED Y/N ___
- If so, were goals well articulated?   YES____   NO____   QUALIFIED Y/N ✔
- Do goals address student learning?   YES____   NO____   QUALIFIED Y/N ✔

Comments:

Similar to the last review dated 11/10/2011, the 2004-05 Assessment Plan is the most recent plan available on the UAC website. Four goals were listed, three of which are directly related to student learning. The following are comments taken from the 2011 review, as they are still applicable:

> *The goals themselves were not written as student-learning goals. Many of the objectives under each were listed as those things the department would provide or the students would practice and gain, rather than what the students would know or be able to do as a result of instruction and practice. The related goals were as follows with those that more closely mirror student learning goal language in bold:*
>
> *Student Learning Goal 1: Provide student with quality instruction in physic.*
> > ***Objective 1.1: Students will acquire a knowledge base in physics, including Newton's Laws and applications, Maxwell's equations, and the basic laws of thermodynamics.***
> > *Objective 1.2: Department will provide good quality instruction through traditional lectures, and/or modern instructional technology and methods.*
> *Student Learning Goal 2: Provide students with the discipline's tools and practical experience in physics.*
> > ***Objective 2.1: Students will be able to use their knowledge base to solve physical problems.***
> > *Objective 2.2: Students will gain hands-on laboratory experience.*
> *Student Learning Goal 3: Contribute to the student's general education.*
> > *Objective 3.1: Students will practice analytic and critical thinking.*
> > *Objective 3.2: Students will practice written communication skills.*

In addition to the program goals, please also consider UND's institutional and Essential Studies goals for student learning (shown in alignment within parentheses) and identify which goals are similar to program goals.
- ✔ 1 Communication – written or oral ("able to write and speak in various settings with a sense of purpose/audience")
- ✔ 2 Thinking and reasoning – critical thinking (or "be intellectually curious"; analyze, synthesize, evaluate)
- **Q** 3 Thinking and reasoning – creative thinking (or "be intellectually creative"; explore, discover, engage)
- ✔ 4 Thinking and reasoning – quantitative reasoning ("apply empirical data…analyze graphical information")
-    5 Information literacy ("be able to access and evaluate…for effective, efficient, and ethical use")
-    6 Diversity ("demonstrate understanding of diversity and use that understanding…")
-    7 Lifelong learning ("commit themselves to lifelong learning")
-    8 Service/citizenship ("share responsibility both for their communities and for the world")

Comments regarding program goals and alignment with institutional and Essential Studies goals:

As stated in the 2011 review, objectives 1.1, 3.1, and 3.2 appear to be aligned with institutional and Essential Studies goals, 1, 2, and 4. Objective 2.2 may also be aligned with Goal 3, but more specificity would make this alignment more apparent.

2. ASSESSMENT METHODS

Were any specific assessment methods referenced?   YES ✔   NO____   QUALIFIED Y/N ____

- If so, were specifically chosen assessment methods appropriately aligned with individual goals?   YES____   NO____   QUALIFIED Y/N ✔
- Were both direct and indirect assessment methods used as components of a "multiple measures" approach?   YES ✔   NO ____   QUALIFIED Y/N ____

Comments:

The annual report states that main instance of indirect assessment was the student course evaluations. Direct assessment methods included: course examinations, quizzes, final examinations, and pre/post tests (systematic evaluation of problem-solving strategy development) given to all students in the introductory two-semester sequence courses.

Because of the nature of the department goals, as discussed in Section 1, it is difficult to determine whether the chosen assessment methods are appropriately aligned with individual goals. It is appears that the department conducts a wide array of assessment but a more thorough discussion of the relationship between student learning goals and the selected assessment methods would be beneficial to the outside reader.

3. ASSESSMENT RESULTS

Were any assessment results reported?   YES ✔   NO____   QUALIFIED Y/N ____

- If so, were the results clear in terms of how they specifically affirm achievement of goals?   YES____   NO____   QUALIFIED Y/N ✔

If so, were the results clear in terms of how they indicate need for improvement?   YES ✔   NO____   QUALIFIED Y/N ____

- Were the results tied to goals for student learning?   YES____   NO____   QUALIFIED Y/N ✔

Comments:

There is a very thorough reporting of results. However, clarifying the language of the learning goals and reporting results in terms of how they relate to each learning goal, would make it more apparent as to whether students are meeting the goals desired by the department.

The annual report is clear as to how they believe the results indicate a need for improvement. However, the connection to student learning goals was not made specifically; therefore, it is difficult for an outside reader to be certain of an alignment between goals and results.

In addition to program goals, some assessment results may be applicable to institutional and Essential Studies goals. Indicate any goals for which the program presents findings, and, for indicated items, describe findings below.
_____ 1 Communication – written or oral ("able to write and speak in various settings with a sense of purpose/audience")
✔ 2 Thinking and reasoning – critical thinking (or "be intellectually curious"; analyze, synthesize, evaluate)
_____ 3 Thinking and reasoning – creative thinking (or "be intellectually creative"; explore, discover, engage)
✔ 4 Thinking and reasoning – quantitative reasoning ("apply empirical data…analyze graphical information")
_____ 5 Information literacy ("be able to access and evaluate…for effective, efficient, and ethical use")
_____ 6 Diversity ("demonstrate understanding of diversity and use that understanding…")
_____ 7 Lifelong learning ("commit themselves to lifelong learning")
_____ 8 Service/citizenship ("share responsibility both for their communities and for the world")

Comments regarding results and the application of results to program, institutional, and Essential Studies goals:

The assessment data reported appear intended to provide information about critical thinking and quantitative reasoning.

4. CLOSING THE LOOP

Were any actions taken on the basis of assessment
results reported?   YES ✔   NO____   QUALIFIED Y/N ____
- If so, do curricular or other improvements/
  changes arising from assessment results
  directly address goals for student learning?   YES ✔   NO____   QUALIFIED Y/N ____

Comments:

The following actions were taken as a result of assessment results:

1. *Allowing additional time for presentation and discussion of material.*
2. *Changing lab procedures to assess student learning at the beginning of each lab.*
3. *Utilizing SCALE-UP classroom.*

SUMMARY

Strengths	*Areas for Improvement*
✔ A specific plan for assessment is in place.	____ No specific plan for assessment is in place.
____Student learning goals are well-articulated.	✔ Student learning goals are not well-articulated.
____Assessment methods are clearly described.	____Assessment methods are not clearly described.
____Assessment methods are appropriately selected.	____ Assessment methods are not appropriately selected.
____Assessment methods are well-implemented.	____ Assessment methods are not well-implemented.
✔ Direct and indirect methods are implemented.	____ A single type of assessment methods predominates.
____Results are reported.	____ No results are reported.
✔ Results are tied to closing the loop.	____Results are not clearly tied to closing the loop.
(Decision-making is tied to evidence.)	(Decision-making is not directly tied to evidence.)

OVERALL SUMMARY AND RECOMMENDATIONS:

The discussion of results in the annual report is to be commended, as it is apparent that this department is committed to assessment, as it relates to assuring that its students are well-served and are learning concepts taught in each course and laboratory. It would benefit the department to follow the recommendations of the 2011 review and work on the language of the student learning goals to more clearly state what the students will be learning versus what they will be practicing, etc. Clarification of the goals would help alignment with institutional and ES goals, and in reporting of results and closing the loop. It appears that the data is embedded in the reporting of the results, but clearer alignment of goals and results would make the efforts of this department more apparent to the outside reader.

MATERIALS REVIEWED

✔ Annual report   ✔ Assessment plan (as posted)
_____ Appendices (cited in annual report)   ✔ Previous assessment review
_____Other (please describe) – Previous annual report

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Section 1: **Q**   Section 2: **Q**   Section 3: **Q**   Section 4: **Y**

Coding Key:

Y = yes, this is done appropriately and well (bearing in mind the kind of program(s) reviewed and recognizing that assessment is a cyclical process, i.e., with additional kinds of data to be collected and analyzed in other years)

Q = qualified yes as action or progress is apparent; however, evidence is lacking that this is completely and appropriately done

N = no, this is not done at all, or it is not done in relationship to student learning

NA = no information reported and it's unclear whether it was done

Revision 9/25/13

DEPARTMENT: Physics   **DATE:**   5/8/2014

PROGRAM(S) COVERED IN REVIEW: Physics (MS and PhD)

COMMITTEE MEMBER(S) CONDUCTING REVIEW: Shari Nelson, Kevin Buettner, & Brett Johnson

1. STUDENT LEARNING GOALS

- Were any goals referenced?   YES ✔   NO____   QUALIFIED Y/N ___
- If so, were goals well articulated?   YES____   NO____   QUALIFIED Y/N ✔
- Do goals address student learning?   YES____   NO____   QUALIFIED Y/N ✔

Comments:

Four goals were listed. The goals themselves were not written as student-learning goals but rather as what the students "will acquire…"

> *Student Learning Goal 1: Students will acquire competency in graduate levels physics including mechanics, electromagnetism, quantum mechanics, statistical physics (for PhD students) and theoretical methods.*
> *Student Learning Goal 2 (MS): Students will acquire in-depth exposure to research.*
> *Student Learning Goal 2 (PhD): Students will acquire skills to carry out programs of independent research at a research laboratory or as a university faculty member.*
> *Student Learning Goal 3: Students will acquire skills in oral presentations and acquire experience in writing research papers.*
> *Student Learning Goal 4: Students will develop analytical skills needed as a professional physicist.*

2. ASSESSMENT METHODS

Were any specific assessment methods referenced?   YES ✔   NO____   QUALIFIED Y/N ____
- If so, were specifically chosen assessment methods appropriately aligned with individual goals?   YES____   NO____   QUALIFIED Y/N ✔
- Were both direct and indirect assessment methods used as components of a "multiple measures" approach?   YES ✔   NO ____   QUALIFIED Y/N ____

Comments:

The annual report states that main instance of indirect assessment was the student course evaluations. Direct assessment methods included: course examinations, quizzes, final examinations, and pre/post tests (systematic evaluation of problem-solving strategy development) given to all students in the introductory two-semester sequence courses.

Because of the nature of the department goals, as discussed in Section 1, it is difficult to determine whether the chosen assessment methods are appropriately aligned with individual goals. It is appears that the department conducts a wide array of assessment but a more thorough discussion of the relationship between student learning goals and the selected assessment methods would be beneficial to the outside reader.

3. ASSESSMENT RESULTS

Were any assessment results reported?   YES ✔   NO____   QUALIFIED Y/N ____
- If so, were the results clear in terms of how they specifically affirm achievement of goals?   YES____   NO____   QUALIFIED Y/N ✔

If so, were the results clear in terms of how they indicate need for improvement?	YES____ NO ✔	QUALIFIED Y/N ____
• Were the results tied to goals for student learning?	YES____ NO ✔	QUALIFIED Y/N ____

Comments:

Results are reported. It is not clear whether they specifically affirm achievement of goals due to the nonspecific nature of the Student Learning Goals.

The annual report states "Since the number of graduate students in these classes is small the undergraduate preparation of incoming students varies much from one year to another, the result of direct assessment may change dramatically from year to year. Hence, assessment is often used as a tool for identifying weakness in students' undergraduate education, rather than using it as measuring student learning goals."

4. CLOSING THE LOOP

Were any actions taken on the basis of assessment results reported?	YES ✔ NO____	QUALIFIED Y/N ____
• If so, do curricular or other improvements/ changes arising from assessment results directly address goals for student learning?	YES ____ NO____	QUALIFIED Y/N ✔

Comments:

The following actions were taken as a result of assessment results:

1. *Faculty pass on to students recommendations regarding their weaknesses which must be remedied*
2. *Student feedback is provided quickly to faculty so that they can adjust their teaching style and shift course emphasis more quickly.*

Discussion of changes made is very limited, so determining connection to goals for student learning is difficult.

SUMMARY

Strengths	*Areas for Improvement*
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____ Assessment methods are clearly described.	____ Assessment methods are not clearly described.
____ Assessment methods are appropriately selected.	____ Assessment methods are not appropriately selected.
____ Assessment methods are well-implemented.	✔ Assessment methods are not well-implemented.
____ Direct and indirect methods are implemented.	____ A single type of assessment methods predominates.
____ Results are reported.	____ No results are reported.
____ Results are tied to closing the loop. (Decision-making is tied to evidence.)	✔ Results are not clearly tied to closing the loop. (Decision-making is not directly tied to evidence.)

OVERALL SUMMARY AND RECOMMENDATIONS:

It would benefit the department to work on the language of the student learning goals to more clearly state what the students will be learning versus what they will be practicing, etc. Collecting data from culminating activities such as presentations, theses, and dissertations, and incorporating this data into the results and closing the loop sections of the annual report, would be beneficial to providing a more complete picture of assessment efforts. This would also make areas of improvement more apparent and relevant to the graduate level courses rather than identifying areas of under-preparation of the students' undergraduate education.

MATERIALS REVIEWED

✔ Annual report   ✔ Assessment plan (as posted)

_____ Appendices (cited in annual report)   _____ Previous assessment review
_____ Other (please describe) – Previous annual report

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Section 1: **Q**   Section 2: **Q**   Section 3: **Q**   Section 4: **Q**

Coding Key:
     Y   = yes, this is done appropriately and well (bearing in mind the kind of program(s) reviewed and recognizing
                that assessment is a cyclical process, i.e., with additional kinds of data to be collected and analyzed in other
                years)
     Q   = qualified yes as action or progress is apparent; however, evidence is lacking that this is completely and
                appropriately done
     N   = no, this is not done at all, or it is not done in relationship to student learning
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Revision 9/25/13