UNIVERSITY ASSESSMENT COMMITTEE
Feedback to Academic Departments on Assessment Activities Reported in 2010 Annual Reports
GRADUATE PROGRAMS

DEPARTMENT_____Physics_____DATE____April 15,2011_____

COMMITTEE MEMBER(S) CONDUCTING REVIEW__Dexter Perkins, JoAnne Yearwood

1. STUDENT LEARNING GOALS

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

Comments:
Goals are referenced in the assessment plan but not in the yearly report. In the plan for "graduate student" assessment the main goals listed are:

- *Student Learning Goal 1: Students will acquire competency in graduate level physics including mechanics, electromagnetism, quantum mechanics, and theoretical methods.*
- *Student Learning Goal 2: Students will acquire in-depth exposure to research.*
- *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.*

They also have a separate plan for PhD students – it is very similar to the one for graduate students in general but sets bars a bit higher.

These goals are, for the most part measurable if they could be focused, in contrast with the department's undergraduate program goals. But, they are somewhat vague – perhaps bullets listing objectives under the goals would help clarify.

A matrix that is included in the assessment plan aligns the goals with some specific metrics.

2. ASSESSMENT METHODS

Were any specific assessment methods referenced? YES__**x**__ NO____ QUALIFIED Y/N ____

- If so, were specifically chosen assessment methods appropriately aligned with individual goals? YES_____ NO__x__ QUALIFIED Y/N ____
- Were both direct and indirect assessment methods used as components of a "multiple measures" approach? YES_____ NO__x__ QUALIFIED Y/N ____

Comments:

They list several sources of data used for assessment in their <u>yearly report</u>:

- *Assessment Using Qualifying and Preliminary Examinations*
- *Assessment Using Physics Students' Seminar*
- *Assessment Using Survey Questions to Alumni*
- *Assessment of graduate student progress by advisor or committee*
- *Pre- and post-testing in graduate physics courses*

Other metrics are in the <u>assessment plan</u> but not referenced in the report:

- *Average examination scores*
- *Samples of student work,*

- *Student interviews.*
- *Review of research project and thesis*
- *Accepted papers*
- *Sample of oral presentations*
- *Examinations and homework.*

We suggest that the Physics department use their assessment plan when they do assessments – it has great potential. They could, if they wish, modify it so it matches current practices.

3. ASSESSMENT RESULTS

Were any assessment results reported?	YES_x__	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 __x__
• If so, were the results clear in terms of how they indicate need for improvement?	YES____	NO__x__	QUALIFIED Y/N ____
• Were the results tied to goals for student learning?	YES____	NO__x_	QUALIFIED Y/N ____

Comments:

Results are given for pre- and post- tests in one class only. No other results are presented.

4. CLOSING THE LOOP

Were any actions taken on the basis of assessment results reported?	YES_____	NO__x__	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:
There is no evidence of closing the loop. They list a few changes that were made but the changes do not seem to be in response to the assessment data they collected.

SUMMARY

Strengths	***Areas for Improvement***
__**x**__ A specific plan for assessment is in place.	____ No specific plan for assessment is in place.
____Student learning goals are well-articulated.	__**x**__ Student learning goals are not well-articulated.
__x__Assessment methods are clearly described.	____ Assessment methods are not clearly described.
____Assessment methods are appropriately selected.	__x__ Assessment methods are not appropriately selected.
____Assessment methods are well-implemented.	__x__ Assessment methods are not well-implemented.
____Direct and indirect methods are implemented.	__x__ 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.)	__x__ Results are not clearly tied to closing the loop. (Decision-making is not directly tied to evidence.)

OVERALL SUMMARY AND RECOMMENDATIONS:

We suggest that the Physics department use their assessment plan when they do assessments – it has great potential. Perhaps they may wish to add to it or modify it so it matches current practices.

Additionally, it would be helpful to see some more assessment results in their yearly report – and some actions they are considering in response to those results.

MATERIALS REVIEWED

__x___ Annual report
_____ Appendices (cited in annual report)
_____ Other (please describe)
__x___ Assessment plan (as posted)
___x__ Previous assessment review

Reviewer(s):	Name	Dexter Perkins	JoAnne Yearwood
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Section 1: _?____ Section 2: _?____ Section 3: _?____ Section 4: __N___

Coding Key:

Y	=	yes, this is done appropriately and well
N	=	no, this is not done at all, or it is not done in relationship to student learning
NA	=	no information available
?	=	action or progress is apparent; however, evidence is lacking that this is completely and appropriately done

UNIVERSITY ASSESSMENT COMMITTEE
Feedback to Academic Departments on Assessment Activities Reported in 2010 Annual Reports
UNDERGRADUATE PROGRAMS

DEPARTMENT___Physics_____DATE April 14, 2011

COMMITTEE MEMBER(S) CONDUCTING REVIEW: Dexter Perkins, JoAnne Yearwood

Overview: The Physics Department's annual report says: "We do not have the resources to assess all of our programs all the time. The department's faculty evolved a strategy to assess first, and often, those parts of our programs which affect the most students. Looking forward toward implementing changes, we chose to concentrate on making changes in the laboratory component of Physics 161, 162, 211, 212, 251, 252, and 253." This comment sounds a warning bell but, in fact, the department has in place the framework for a good assessment system.

1. STUDENT LEARNING GOALS

• Were any goals referenced?	YES__x__	NO____	QUALIFIED Y/N ___
• If so, were goals well articulated?	YES____	NO____	QUALIFIED Y/N _x__
• Do goals address student learning?	YES____	NO____	QUALIFIED Y/N _x__

Comments:

Student Learning Goals (dated 2004-2005 Academic Year)

Student Learning Goal 1: Provide student with quality instruction in physics.
- *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.*

Student Learning Goal 4: Preparing students for their career goals.
- *Objective 4.1: 1 Department will help students realize a broad range of physics related career goals.*
- *Objective 4.2: Students will gain research experience in physics.*

While good intent is there, most of the goals/objectives are not listed in terms of student leaning outcomes. It would be good to rewrite them to specifically say what students are supposed to be able to do <u>after</u> they complete their degree, rather than describing what they will do <u>while</u> they complete their degree. This would make assessment easier and also would guide the department as they consider changes for the future.

In addition to the Departmental goals, please also consider UND's Institutional and Essential Studies goals for student learning (shown in alignment within parentheses). Use 'U' (undergraduate) to identify UND/Essential Studies goals which are similar to the referenced departmental 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)

_____ 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 departmental goals and alignment of departmental goals with institutional and Essential Studies goals:

Specific objectives address critical thinking and communication, and there is no doubt that these are part of the program. It is unclear however, whether students receive specific instruction in these areas or how they are assessed.

2. ASSESSMENT METHODS

Were any specific assessment methods referenced?	YES__**x**__	NO____	QUALIFIED Y/N ____
• If so, were specifically chosen assessment methods appropriately aligned with individual goals?	YES_____	NO____	QUALIFIED Y/N __x__
• Were both direct and indirect assessment methods used as components of a "multiple measures" approach?	YES_____	NO____	QUALIFIED Y/N __x__

Comments:

The assessment plan and yearly report list a large number of tools that are used for assessment:

- *Standard USAT forms*
- *SGIDs*
- *". . . instructor may also request colleagues to critique lectures, laboratories or recitation sessions."*
- *Exit interviews with randomly selected students*
- *The Department will keep . . . course syllabi and . . . student grade distributions . . .*
- *Department members will meet periodically with members of the client departments for whose students service courses are offered.*
- *The Department has created a Student Grievance Committee . . .*
- *The Department members created the Direct Assessment of Teaching Committee . . .*
- *Survey alumni two years after graduation to find out how Physics programs prepared them for what they are doing now, and to solicit suggestions for changes.*
- *Pre- and post-tests for students in our Physics 150, 161, 162, 211, 212, 251, and 252 courses.*
- *There are a large number of standard tests that can be used as assessment tools. We used the Force Concept Inventory for Physics 150/161/211/251 and either BEMA (Brief Electricity & Magnetism Assessment) or DIRECT for Physics 162/212/252.*

The assessment plan provides a matrix showing alignment between goals and metrics. It is encouraging to see things presented in this way and shows some careful thought and consideration. Some of the connections, however, are stronger than others.

Some of the tools listed above (bullets) can be expected to produce valuable assessment data. Most probably do not. ***Of much greater significance,*** *in 2007-08, the department developed a way to measure how students think and approach Physics problems, and to identify significant problem areas. It is:*

- *". . . an assessment tool which is unique to UND's Department of Physics and Astrophysics and extraordinary in it's ability to point to areas where we should make changes."*

The tool, really a series of concept tests, administered in some form in several key classes, uses open-ended multi-part questions to measure student understanding of basic physics principles and to identify misconceptions. Student responses are

compared with responses from Physics faculty and graduate students. This approach can be very powerful and reveal information fundamental for program improvement.

3. ASSESSMENT RESULTS

Were any assessment results reported?	YES__x__	NO____	QUALIFIED Y/N ____
• If so, were the results clear in terms of how they specifically affirm achievement of goals?	YES__x__	NO____	QUALIFIED Y/N ____
• If so, were the results clear in terms of how they indicate need for improvement?	YES__x__	NO____	QUALIFIED Y/N ____
• Were the results tied to goals for student learning?	YES____	NO__x__	QUALIFIED Y/N ____

Comments:

The yearly report provides many detailed results (perhaps too many?) – all generated by responses to the open-ended concept tests. The report does not specifically connect these results to the learning goals and objectives, but the connections can be inferred.

Results of other metrics are not provided. But, this may be OK for now because the problem-based concept tests are very powerful.

In addition to departmental goals, some assessment results may be applicable to institutional and Essential Studies goals. Use 'U' (undergraduate) to identify those results which are applicable to institutional/Essential Studies goal achievement. For indicated items, please describe findings in the appropriate section 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)
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_____ 8 Service/citizenship ("share responsibility both for their communities and for the world")

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

None of the ES goals align well with the department assessment results.

4. CLOSING THE LOOP

Were any actions taken on the basis of assessment results reported?	YES_____	NO__x__	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 yearly report clearly identifies areas of "concern" and of "great concern" and says that improvements are needed. Few or no concrete changes are listed in response to these concerns.

SUMMARY

Strengths	***Areas for Improvement***
__x__ A specific plan for assessment is in place.	____ No specific plan for assessment is in place.

____Student learning goals are well-articulated.
__x__Assessment methods are clearly described.
__x__Assessment methods are appropriately selected.
__x__Assessment methods are well-implemented.
____Direct and indirect methods are implemented.
__x__Results are reported.
____Results are tied to closing the loop.
(Decision-making is tied to evidence.)

__**x**__ Student learning goals are not well-articulated.
____ Assessment methods are not clearly described.
____ Assessment methods are not appropriately selected.
____ Assessment methods are not well-implemented.
__x__ A single type of assessment methods predominates.
____ No results are reported.
__x__ Results are not clearly tied to closing the loop.
(Decision-making is not directly tied to evidence.)

OVERALL SUMMARY AND RECOMMENDATIONS:

The Physics Dept. has a (potentially) very strong assessment plan. Two things to consider as they move forward:

- *The department may wish to integrate other kinds of data into the assessments (besides the concept tests).*
- *Specific actions should be taken in response to problems they have identified.*

MATERIALS REVIEWED

__x___ Annual report
_____ Appendices (cited in annual report)
_____ Other (please describe)

___x__ Assessment plan (as posted)
___x__ Previous assessment review

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