Physics Department Program Review Fall 2010

1. Assessment Plan and Summary for Each Program

   The Physics Department offers a total of eleven undergraduate and graduate degrees concentrated in five main areas of the program, Physics (BA, BS, MS, MAT and PhD), Applied Physics (BS), Space Physics (MS

a. Assessment Plans

UNIVERSITY OF ALASKA FAIRBANKS
Department of Physics

Outcomes Assessment for Undergraduate Programs in the UAF Physics Department

1 February 2005

1.0 Applicable Degrees

This assessment program is applicable to all undergraduate degrees for which the UAF Physics Department has responsibility. These are the BS and BA degrees in Physics and the BS degrees in Applied Physics and General Science. No distinction is made for the purpose of implementation, but there are slight differences in wording between the physics and general science questionnaires, as the general science students are concerned with science courses in many other departments other than the Physics Department.

2.0 Program Objectives

The objectives of each degree program in terms of academic achievement should be clearly specified in the UAF Catalog. First, this is a single, widely available document that stipulates all degree requirements and course offerings. Second, by identifying a sole source, the possibility of stale information in a second or additional forgotten sources is eliminated. Any deficiencies in current listings will be corrected at the next opportunity in order to fulfill the needs of the assessment program.

3.0 Physics Department's Undergraduate Program Office

The Physics Department operates an Undergraduate Program Office staffed by the department's administrative assistant. Supervision of the Undergraduate Program Office is the responsibility of the department chair, with leadership for mentoring of physics-related degree majors provided by departmental faculty members. A single faculty member mentors all general science majors and is responsible to the faculty for the general science program. The department's administrative assistant maintains all relevant departmental records and carries out routine communications with the UAF Registrar's Office and all current undergraduate students.

The procedure within the Physics Department for admission of students into a degree program is to accept all students who declare physics or general science as their intended degree major (unless grades are a serious concern). The department's administrative assistant routes the student's name to an assigned departmental mentor (undergraduate advisor) and so informs the student. The undergraduate faculty advisors comprise the department's undergraduate Assessment Review Committee. The department chair can be an ad hoc member if the committee so desires.

4.0 The Assessment Plan

The existing assessment plan is built around a written exit survey (or "interview") that comprises two parts; set questions with numerical answers and optional written comments. The survey is submitted to each student in the last semester of his or her degree program, and can be submitted anonymously if the student so elects. Copies of the physics and general science forms used for the

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UAF Physics Department's Exit Interview

Graduating Baccalaureate Students in Physics Programs

The purpose of this exit interview is to capture your personal evaluation of the physics degree program that you have successfully completed. The results assist us in fulfilling one of our self-imposed obligations as part of UAF's mandated student learning outcomes assessment program, which is designed to create a feedback path from the outcome (your successful degree program) to the input (student selection and program content).

The interview comes in two parts; written and oral. The written part is completed prior to your departure from campus after final exams. It can be done anonymously or openly (by signing your name); the choice is yours. In either case, please return the

UAF Physics Department's Exit Interview

Graduating Baccalaureate Students in Physics Programs

Year Entered Program_____ Year Graduating _____

Program Degree _____ NAME (Optional) _____
B.S. or B.A. in Physics or Applied Physics

Upon graduation, I am:

- ❑ Taking a job related to my major
- ❑ Taking a job unrelated to my major
- ❑ Continuing my studies in a professional/graduate school
- ❑ Other

Please provide an answers using this numerical scheme:_____
1= strongly disagree **2**= disagree **3**= neutral **4**= agree **5**= strongly agree

1. I can recommend UAF to another student.
2. In general, the quality of instruction at UAF is high.
3. In concept, the UAF baccalaureate core curriculum is a good idea.
4. UAF as a whole provides a stimulating atmosphere for undergraduate study.

5. I can recommend my physics degree

WRITTEN COMMENTS (both sides, if needed)

If you wish, describe an area (or areas) in which the instructional program was; (a) very good; (b) acceptable or in need of minor improvements; and/or (c) sadly lacking.

Are there any general thoughts on the department that you would like to share?

Please return this form to the Physics Department's Office in the NSF using the accompanying self-addressed envelope. It can be mailed or delivered in person. Thank you!

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UAF Departmental Exit Interview for Graduating Baccalaureate Students in the General Science Program

The purpose of this exit interview is to capture your personal evaluation of the general science degree program that you have successfully completed. The results assist us in fulfilling one of our self-imposed obligations as part of UAF's mandated student learning outcomes assessment program, which is designed to create a feedback path from the outcome (your successful degree program) to the input (student selection and program content).

The interview comes in two parts; written and oral. The written part is completed prior to your

UAF Departmental Exit Interview for Graduating Baccalaureate Students in the General Science Program

Year Entered Program_____ Year Graduating _____

Program Degree _____ NAME (Optional) _____
B.S. or B.A. in General Science

Upon graduation, I am:

- ❑ Taking a job related to my major
- ❑ Taking a job unrelated to my major
- ❑ Continuing my studies in a professional/graduate school
- ❑ Other

Please provide an answers using this numerical scheme:_____
1= strongly disagree **2**= disagree **3**= neutral **4**= agree **5**= strongly agree

1. I can recommend UAF to another student.
2. In general, the quality of instruction at UAF is high.
3. In concept, the UAF baccalaureate core curriculum is a good idea.
4. UAF as a whole provides a stimulating atmosphere for undergraduate study.

5. I can recommend my general science degree program to another student.
6. I am pleased with the curriculum in my general science degree program.
7. The quality of instruction in the various science departments is high.
8. Class sizes in the science classes are appropriate.

WRITTEN COMMENTS (both sides, if needed)

If you wish, describe an area (or areas) in which the general science instructional program was; (a) very good; (b) acceptable or in need of minor improvements; and/or (c) sadly lacking. You can be specific to individual science departments in your program.

At UAF, the Physics Department administers the General Science Program. Please return this form to the Physics Department's Office in the NSF using the accompanying self-addressed envelope. It can be mailed or delivered in person. Thank you!

This page is to be detached by the Physics Department's Office in the NSF from all other materials in this packet.

FORWARDING ADDRESS

The outcomes assessment program includes a final interview five years after graduation. Please provide a forwarding address and assist us by letting us know of future address changes.

Name: _____

Address:

Email Address:

Table 1: Undergraduate physics outcome assessments implementation summary

Physics Department

BS, BA in Physics, BS in Applied Physics, BS in General Physics

	2007-2008	**2008-2009**	**2009-2010**
Assessment Information Collected	Questionnaire and request for written comments.		
Conclusions drawn from this information	1. Students were highly pleased with the quality of instruction, small classes, stimulating atmosphere, faculty care and accessibility. 2. Students thought the UAF Baccalaureate Core Curriculum is a good idea. 3. One of the respondents was not satisfied with research opportunities in the department. 4. Students were highly satisfied with personal care, advising, and guidance of faculty advisors. 5. Students expressed extreme satisfaction for services and help from department staff. 6. Students suggested that the one-credit module courses need better organization, should be less involved and more fun. 7. One of the students was not satisfied with Physics Advanced Lab (PHYS 381/382) due to out-dated equipment, lack of funding, and the method of teaching. This particular student was also not happy with PHYS 342, as the instructor did not follow the textbook. 8. The number of responses from the graduating students is very small.		

Resulting Curricular Changes

1. Continue the good effort and work for a fulfilling academic experience.

2. No action needed.

3. More than 90% of our majors have had research experience before they graduate. The department should explore ways to make research opportunity possible for any student who would like to participate.

4. Physics Department has every student assigned to a member of the faculty for academic advising.

5. No action needed.

6. One-

Outcomes Assessment for Graduate Programs in the UAF Physics Department

10 February 2004

1.0 Applicable Degrees

This assessment program is applicable to all graduate degrees for which the UAF Physics Department has responsibility. These are the

4.0 Outline of the Assessment Plan

A program that evaluates educational outcomes must have a beginning, should, for perspective, follow the student's progress within a degree program, and must have an ending, successful or not. It must be based upon a process that is not onerous to a heavily burdened faculty and administrative staff, or it will simply fail. Lastly, the plan must provide a viable means through which a committee can routinely obtain and summarize relevant information for the assessment of its educational practices and provide suggestions for improvements.

The plan previously implemented by the Physics Department is improved and further clarified herein to capture and evaluate relevant data gained within a period from first contact through a final review five years after graduation. The data-gathering requirements are based largely on processes already in place and on data that must be obtained in the post-graduation period of professional development by the former graduate student. There are two objectives; (1) provide a student-based assessment of the academic and research programs in the educational experience and (2) provide a faculty-based assessment of a student's development from acceptance into a graduate program through establishment of a post-graduate career. Collectively, these assessments form the bases for recommendations to the departmental faculty for any modifications to the degree program and its processes.

The first parts of this plan are the most mature in that many parts have been functioning for decades. It is the latter parts of the plan that are less well developed and may well evolve during implementation. For example, no five-year surveys have yet been gained.

5.0 Details of the Plan

5.1 Student File at Entrance into a Degree Program

5.1.1 Process

A student's entry into a physics or general science graduate degree program is accompanied by the automatic creation of an assessment file into which is compiled all reviewers' evaluations of strengths and weaknesses and a synopsis of undergraduate performance (as assembled by the assessment committee). The program secretary transcribes the relevant data into individual files. Assessment of outcomes is independent of assessment of academic progress, and does not constitute an element of the student's academic file.

5.1.2 Assessment

During the application and review period (usually beginning in the fall and extending through the following spring semester), it is generally possible, based on experience, to classify applicants in four categories: excellent (3); acceptable (2); marginal (1); and unacceptable or rejected (0). For applicants in the highest classification, offers are generally issued immediately upon completion of the review process, and, at a more

deliberate pace, as many offers as are necessary from the second classification may be made to fulfill the total number of open teaching and research positions. It is not unheard of to make a few offers within the third classification. Upon completion of all graduate acceptances for the fall semester, the cohort classification (3,2,1) is reviewed and made final. This classification along with the substantive statements on strengths and weaknesses by the three initial departmental faculty reviewers and the other supporting information are entered into the department's assessment file for each applicant that enrolls in the physics program at UAF.

5.2 Tracking Student Performance

5.2.1 Process

The first year of a graduate student's career is nominally spent in academic coursework and as a teaching assistant to the lower-division undergraduate courses. This work is supervised by the department's teaching laboratory supervisor. It is expected that each graduate student will become associated with a faculty mentor by the end of the second semester and will immediately form a graduate advisory committee. Failure to do so is considered by CSEM to be grounds for dismissal from the graduate program.

Beginning with formation of the graduate advisory committee, a graduate student meets formally with his or her graduate advisor (research mentor) and graduate advisory (thesis) committee once a year to review academic and research progress towards the intended degree. Written substantive comments by the committee provide snapshots of the student's development from the perspective of the mentor and the committee. Individual substantive comments are encouraged. These comments are especially informative and pertinent for outstanding successes or difficulties in a year or over years, and especially in case of an unsuccessful outcome. It is important that the mentor and committee members understand and appreciate the importance of their obligations to the assessment process.

5.2.2 Assessment

Substantive comments by the graduate advisory committee and the committee's overall evaluation of progress as satisfactory, conditional, or unsatisfactory are used by the assessment review committee to classify the cumulative history of annual reviews as excellent (3), acceptable (2), marginal (1), or unacceptable (as in termination) (0). This classification, supportive summary statements by the assessment committee, and yearly substantive comments by the advisory committee in its yearly reports are entered into the student's assessment file and updated yearly.

In the event that a graduate student does not meet the college and university requirements for good standing, the student can be removed from the degree program. In this case, the assessment committee will enter a brief explanation into the file.

5.3 Exit Survey/Interview and Evaluation

5.3.1 Process

An exit survey instrument has been in existence for many years and while it appears to be somewhat viable, a faculty review is warranted. This survey is conducted when the thesis or project has been completed and approved by the student's graduate advisory committee. The department chair and college dean are not supposed to sign the final thesis or project documents until the exit survey has been completed. The program secretary organizes completion of the written survey. The assessment committee carries out any personal interview. There is some question about multiple exit interviews: department, CSEM dean, and the Graduate School. Are we collectively overdoing it?

5.3.2 Assessment

This third stage comprises two different aspects. As part of the faculty evaluation, the assessment committee uses the student's immediate plans and success of the thesis or project as a measure of outcome from the faculty perspective. The assessment committee relies on substantive comments by the graduate advisory committee following the thesis (or project) defense and on answers provided by the student in a standardized exit survey document. Again, a simple 4-level scoring system is used: excellent (3), acceptable (2), poor (1), or unacceptable (as in termination) (0).

The second part comprises the student's evaluation of the program in the standardized exit survey and an optional personal interview with a member of the 96 nudent'(as sment8.475 0

Outcomes Assessment for Graduate Programs in the UAF Physics Department

submitted to the Dean of CSEM dean and to the Vice Provost for Academic Affairs. These are not for public distribution. No students' names are included in the report.

7.0 The Four-Year Report

A formal assessment report at four-year intervals is prepared by the department chair for submission to the Vice Provost for Academic Affairs. This report is based on the data collected, content of the yearly reports, assessment committee recommendations, and faculty actions that followed from the assessment to improve the academic curriculum and student research.

It would be highly speculative to attempt an outline of how the faculty would respond to a recommendation by the assessment committee, for it would depend in large part on the strength of the data leading to the recommendation; to know what is noise and what is signal.

A first report is expected by March 2004.

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UAF Physics Department's Exit Interview

Graduating M.S. and Ph.D. Students in Physics Programs

The purpose of this exit interview is to capture your personal evaluation of the physics degree program that you have successfully completed. The results assist us in fulfilling one of our self-imposed obligations as part of UAF's mandated student learning outcomes assessment program, which is designed to create a feedback path from the outcome (your successful degree program) to the input (student selection and program content).

The interview comes in two parts; written and oral. The written part is completed prior to the department chair signing your final paperwork; e.g., MS thesis or PhD dissertation. For a MS project, it may have to be completed before signing the Report of Examination. It can be done anonymously or openly (by signing your name); the choice is yours. In either case, please return the completed form (in the accompanying envelope) to the department's administrative secretary in our Graduate Program Office. She will preserve any requested autonomy and enter the information into to a larger anonymous database from which the department will construct its outcomes assessment report for the Vice Provost for Instructional Affairs.

We would be particularly grateful if you would agree to an oral interview with a member or members of the outcomes assessment committee. You can discuss this with the GPO administrative secretary, who can arrange a meeting as per your request.

In the end, it is the substantive comments made by you that are most helpful. Positive comments tell us where we are succeeding, while constructive negative comments will be used in seeking improvements in our programs. Benefits of this adventure are that you will have given a gift to future graduate students of our program.

The Graduate Outcomes Assessment Committee:
Scott Bailey, Martin Truffer, and John Craven

This page is to be detached by the GPO from all other materials in this packet.

FORWARDING ADDRESS

The outcomes assessment program includes a final interview five years after graduation. Please provide a forwarding address and assist us by letting us know of future address changes. In turn, we will keep you informed of our department's activities

Name _____

Address

Table 1: Graduate physics outcome assessments implementation summary

Physics Department

MS, PhD in Physics and Space Physics, MS in Computational Physics, MS in General Science

	2007-2008	2008-2009	2009-2010
Assessment Information Collected	Questionnaire and request for written comments.		
Conclusions drawn from this information	1. Most of the students were highly pleased with their research experience, degree program, advisor and faculty. 2. Some of the students expressed dissatisfaction with some elements of instruction concerning graduate courses PHYS 631/632 and PHYS 622. 3. A small fraction of students were not happy with available research funding. 4. Some students were not pleased with department website for not having enough information about the research activities of the faculty and information about student body. 5. One of the participating students was not happy about the inter-departmental communication between the faculty and students regarding personnel changes in the department. 6. Some of the students expressed dissatisfaction over not having advanced courses in Quantum Mechanics and Plasma Physics (outside the curriculum) taught by the department. 7. Some of the students would have liked more faculty involved teaching the graduate courses. 8. A small fraction of the respondents were dissatisfied with the fact that the faculty are not more involved in managing the labs, TAs and Lab Supervisor.		

Resulting Curricular Changes	1. Continue with what we are doing with our research programs and quality of instruction. 2. Assessment Committee will re-visit the issue, examine the reasons for dissatisfaction, and, if necessary, will suggest remedies to the instructor(s) concerned. 3. Every effort is made by the faculty to support all graduate students on research assistantship, but the department needs to make a concerted effort to bring more funding, so that all students can have financial support to continue research. 4. The department is already working to improve the

Physics 2007 Refereed Publications

Newman, David E., Paul W. Terry, Andrew S. Ware, *Shear Flows and Turbulence in Nature,* Computing in Science and Engineering, vol. 9, no. 6, pp. 45-52, Nov/Dec, 2007

Ian Dobson, Benjamin A. Carreras, Vickie E. Lynch, and David E. **Newman**, *Complex systems*

Boyce, E.S., R.J. Motyka, and M. **Truffer**. 2007. Flotation and retreat of a lake-calving terminus, Mendenhall Glacier, Southeast Alaska. J. Glaciol., 53(181), 211-224.

Physics 2008 Refereed Publications

Amundson, J. M., **M. Truffer**, M. P. Luthi, M. Fahnestock, M. West and R. J. Motyka (2008). "Glacier, fjord, and seismic response to recent large calving events, Jakobshavn Isbrae, Greenland." Geophysical Research Letters **35**(22).

Bezrodny, V. G., O. V. Charkina, V. G. Galushko, K. Groves, A. S. Kashcheyev, **B. J. Watkins**, Y. M. Yampolski and Y. Murayama (2008). "Application of an imaging F16(. 0 11.04 72 557.28 Tm (t).

Terry, P. W., M. Greenwald, J. N. Leboeuf, G. R. McKee, D. R. Mikkelsen, W. M. Nevins, **D. E. Newman**, D. P. Stotler, U. S. B. P. O. U. S. T. T. Task Grp Verification Validat and Force (2008). "Validation in fusion research: Towards guidelines and best practices." Jon