MEMO
7 June 2007

To: Dr. Susan Henrichs
   Vice Provost of Instructional Affairs

Through: Dr. Joan Braddock
         Dean, CNSM

From: Dr. John Craven
      Chair and Professor, Physics Department

Subject: Report on 2006 Outcomes Assessment for the Physics Department

An annual outcomes assessment report is belatedly submitted herein for the Physics Department. Per instructions, there is a one-page report for each of the four undergraduate and seven graduate degree programs. Faculty reports for the undergraduate and graduate programs are attached, as are copies of each underlying assessment plan.

By way of a roadmap, the order of materials is as follows:
   One-page reports for the undergraduate programs
   One-page reports for the graduate programs
   Physics faculty report for the undergraduate programs
   Physics faculty report for the graduate programs
   Assessment plans for the undergraduate programs
   Assessment plans for the graduate programs.
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

UNDERGRADUATE DEGREE PROGRAM:
  _X_ BS, PHYSICS
  _____ BA, PHYSICS
  _____ BS, APPLIED PHYSICS
  _____ BS, GENERAL SCIENCE

SUBMISSION DATE:  16 May 2006       BY:  Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2005.

Outcomes assessment data collected this year:
Exit surveys were received from all four (4) students who graduated in 2006.
Five-year post graduation surveys were received from all four (4) graduates in 2001.

Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year post graduation interviews.
A direct measure of student leaning has yet to be devised and approved by the faculty.

Faculty committee review any assessment data in this year:
Yes, and a copy is attached.

Changes in curriculum made this year:
Beginning implementation of the physics curriculum changes made last year

Budget implications from assessment:
Changes made to the curriculum were due in part to the lack of funds to support the overall program, undergraduate and graduate, at an acceptable level. The changes were also due in part as our response to student suggests for curriculum revisions.
Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2005.

Outcomes assessment data collected this year:
There was one graduate from this program in 2006, but no exit survey was received. There appears to have been one graduate in 2001, but no five-year post graduation survey was received.

Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year post graduation interviews. A direct measure of student leaning has yet to be devised and approved by the faculty.

Faculty committee review any assessment data in this year:
No

Changes in curriculum made this year:
Beginning implementation of the physics curriculum changes made last year.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

UNDERGRADUATE DEGREE PROGRAM:

_____ BS, PHYSICS
_____ BA, PHYSICS
__X__ BS, APPLIED PHYSICS
_____ BS, GENERAL SCIENCE

SUBMISSION DATE: 16 May 2007  BY: Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2005.

Outcomes assessment data collected this year:
There were no graduates from this program in 2006.

Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year post graduation interviews.
A direct measure of student learning has yet to be devised and approved by the faculty.

Faculty committee review any assessment data in this year:
No

Changes in curriculum made this year:
Beginning implementation of the physics curriculum changes made last year. Added an option in Technical Management in collaboration with the School of Management.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

UNDERGRADUATE DEGREE PROGRAM:

_____ BS, PHYSICS
_____ BA, PHYSICS
_____ BS, APPLIED PHYSICS
__X__ BS, GENERAL SCIENCE

SUBMISSION DATE:   16 May 2007   BY:   Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2005.

Outcomes assessment data collected this year:
There were no graduates in 2006.

Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year post graduation interviews.
A direct measure of student leaning has yet to be devised and approved by the faculty.

Faculty committee review any assessment data in this year:
No

Changes in curriculum made this year:
Beginning implementation of the physics curriculum changes made last year.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

GRADUATE DEGREE PROGRAM:

- X MS, PHYSICS
- MS, SPACE PHYSICS
- MS, COMPUTATIONAL PHYSICS
- MS, GENERAL SCIENCE
- PhD, PHYSICS
- PhD, SPACE PHYSICS
- PhD, ATMOSPHERIC SCIENCE

SUBMISSION DATE: 30 May 2007  BY: Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2004.

Outcomes assessment data collected this year:
There were no graduates in 2006.
There were no graduates five years ago.
Assessment files were updated as new information was submitted.

Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year interviews of graduates.
Continued assembly and evaluation of assessment files by the review committee, as per the assessment plan.

Faculty committee formal review of any assessment data in this year:
No

Changes in curriculum made this year:
Trial graduate course in non-linear dynamics was created for spring 2008.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

GRADUATE DEGREE PROGRAM:
   _____ MS, PHYSICS
   _____ MS, SPACE PHYSICS
   ___ MS, COMPUTATIONAL PHYSICS
   ____ MS, GENERAL SCIENCE
   ____ PhD, PHYSICS
   ____ PhD, SPACE PHYSICS
   ____ PhD, ATMOSPHERIC SCIENCE

SUBMISSION DATE:  30 May 2007      BY:  Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2004.

Outcomes assessment data collected this year:
There were no graduates in 2006.
There was one graduate five years ago and he returned a survey questionnaire.
Assessment files were updated as new information was submitted.

Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year interviews of graduates.
Continued assembly and evaluation of assessment files by the review committee, as per
the assessment plan.

Faculty committee formal review of any assessment data in this year:
Yes

Changes in curriculum made this year:
None

Budget implications from assessment:
Student response (for the M.S. program) notes the absence of a regular offering of the
course Advanced Plasma Physics. Current faculty is unable to cover this course without a
contract overload and an unacceptable reduction in research work. This course would be
of interest to some students in the MS program but outside reviewers have noted with
surprise its absence in the PhD program.
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

GRADUATE DEGREE PROGRAM:

____ MS, PHYSICS
____ MS, SPACE PHYSICS
__X__ MS, COMPUTATIONAL PHYSICS
____ MS, GENERAL SCIENCE
____ PhD, PHYSICS
____ PhD, SPACE PHYSICS
____ PhD, ATMOSPHERIC SCIENCE

SUBMISSION DATE: 30 May 2007  BY: Dept. Chair, John Craven

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Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year interviews of graduates.
Continued assembly and evaluation of assessment files by the review committee, as per the assessment plan.

Faculty committee formal review of any assessment data in this year:
No

Changes in curriculum made this year:
Trial graduate course in non-linear dynamics was created for spring 2008.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

GRADUATE DEGREE PROGRAM:

_____ MS, PHYSICS
_____ MS, SPACE PHYSICS
_____ MS, COMPUTATIONAL PHYSICS
__X__ MS, GENERAL SCIENCE
_____ PhD, PHYSICS
_____ PhD, SPACE PHYSICS
_____ PhD, ATMOSPHERIC SCIENCE

SUBMISSION DATE:  30 May 2007    BY:  Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2004.

Outcomes assessment data collected this year:
There were no graduates in 2006.
There was one graduate five years ago, but he could not be located.

Outcomes assessment data planned for collection next year:
Overall, the collection of exit interviews in the General Science program has not been
good. The faculty has discussed this and changes will be made to improve communications.

Faculty committee formal review of any assessment data in this year:
No

Changes in curriculum made this year:
None

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

GRADUATE DEGREE PROGRAM:

_____ MS, PHYSICS
_____ MS, SPACE PHYSICS
_____ MS, COMPUTATIONAL PHYSICS
_____ MS, GENERAL SCIENCE
_____ PhD, PHYSICS
_____ PhD, SPACE PHYSICS
_____ PhD, ATMOSPHERIC SCIENCE

SUBMISSION DATE:   30 May 2007       BY:    Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2004.

Outcomes assessment data collected this year:
There was one graduate in 2006 and he provided an exit survey questionnaire.
There was one graduate five years ago but he did not fulfill a promise to provide a survey
questionnaire.
Assessment files were updated as new information was submitted.

Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year interviews of graduates.
Continued assembly and evaluation of assessment files by the review committee, as per
the assessment plan.

Faculty committee formal review of any assessment data in this year:
Yes

Changes in curriculum made this year:
Trial graduate course in non-linear dynamics was created for spring 2008.

Budget implications from assessment:
None
Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2004.

Outcomes assessment data collected this year:
There were no graduates in 2006.
There were no graduates five years ago.

Outcomes assessment data planned for collection next year:
Exit interviews at graduation and five-year interviews of graduates.
Continued assembly and evaluation of assessment files by the review committee, as per the assessment plan.

Faculty committee formal review of any assessment data in this year:
No

Changes in curriculum made this year:
None

Budget implications from assessment:
Student response (for the M.S. program) notes the absence of a regular offering of the course Advanced Plasma Physics. Current faculty is unable to cover this course without a contract overload and an unacceptable reduction in research work. This course would be of interest to some students in the MS program but outside reviewers have noted with surprise its absence in the PhD program.
ANNUAL OUTCOMES ASSESSMENT REPORT FOR 2006

UAF PHYSICS DEPARTMENT

GRADUATE DEGREE PROGRAM:
   _____ MS, PHYSICS
   _____ MS, SPACE PHYSICS
   _____ MS, COMPUTATIONAL PHYSICS
   _____ MS, GENERAL SCIENCE
   _____ PhD, PHYSICS
   _____ PhD, SPACE PHYSICS
   __X__ PhD, ATMOSPHERIC SCIENCE

SUBMISSION DATE:   30 May 2007        BY:  Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2004.

Outcomes assessment data collected this year:
This program is no longer within the Physics Department. There will be no more graduates.
There were two graduated five years ago. Only one provided a survey questionnaire.
Assessment files were updated as new information was submitted.

Outcomes assessment data planned for collection next year:
This program is no longer within the Physics Department, so the only remaining tasks are the several remaining five-year interviews in the appropriate years.

Faculty committee formal review of any assessment data in this year:
Yes

Changes in curriculum made this year:
N/A

Budget implications from assessment:
N/A
Physics Department

Annual Report of Outcomes Assessment

Undergraduate Programs in 2006

John Craven
Chair, Physics Department

30 May 2007
Annual Report of Outcomes Assessment
by the Physics Department’s Faculty
for Undergraduate Programs in 2006

This report is for the Physics Department’s 2006 BS program in Physics, for which there were four graduates. A student who received a BA degree did not provide any information.

The primary method of assessing outcomes has been to obtain “exit interviews,” or surveys, from each graduating student. The survey is in the form of a questionnaire and a request for written comments. Invitations for personal interviews with the department chair or an alternate faculty member of the student’s choice are also offered. One student made use of this option. The results for this assessment activity are provided in Part 1 of this report.

An opportunity is also provided to all graduates five years later, when we present a questionnaire that includes post-graduation career choices and opinions about their UAF experience. Four of five survey questionnaires were returned this year from five-year graduates. The results for this assessment activity are provided in Part 2 of this report.

This first page presents a summary of the issues extracted from the assessment activity that require attention by the faculty at the outset of the next academic year. The basis for these issues derives from an analysis of the information gained in Part 1 and Part 2.

Each of the two parts is laid out in the same manner: summary findings followed by the underlying data. The first page of each part (Section 1.A and 2.A) contains a summary of the significant finding(s) from the data. Section 1.B provides a compact summary of the main points raised in the written comments by each graduating student. Section 1.C provides an interpretation of the results contained in the questionnaire, whose individual results are given in Table 1. For comparison, the corresponding numerical results for graduating students in 2005 are provided in Table 2. Section 2.B contains a distillation of responses by the four students who graduated five years ago; it is a summing of the individual comments. The last section, 2.C, contains a summary of individual written comments by the former students. This format is used in place of direct quotes to aid in removing specific references to faculty members; this is done privately.

Recommendations for faculty consideration in the fall semester that follow from this assessment activity are given below. In addition, it is acknowledged that the department has yet to create a direct measure of assessing undergraduate outcomes. This must be done.

- Undergraduate research. Are adequate opportunities available for students who are interested? Are we getting the word out? We think we are, but questions remain.
- Career counseling and information on careers. What has been done does not appear to be adequate. We must devise ways to overcome this apparent shortcoming.

It is also noted that, once again, the UAF baccalaureate core curriculum did not fair well in the student assessments. Adequate definition and communication may be lacking.
PART 1

Graduation Assessment for the Physics Undergraduate BS Program in 2006

1.A. Summary of Significant Finding and Our Response

Significant Findings

1. Overwhelming tone of the student assessments of the Physics Department’s program has been very positive; students are successful in making use of their technical training; the overall program was viewed as very good; and the faculty and staff were accessible and helpful.

2. Noted the difficult transition from PHYS 211/212 to PHYS 311 (Mechanics) in the junior year and the large increase in mathematical requirements without perception of adequate preparation.

3. Good preparation for graduate school, but the preparation was not uniform; too little coverage of nuclear and particle physics was cited as an example.

4. Expressed interest in courses outside the general requirements.

5. Support for undergraduate research experience and perhaps an undergraduate research thesis.

6. Good access to faculty and staff.

7. Good impression of the new curriculum as it is about to be introduced.

Department Responses to Issues for Improvement

It is the general belief of the faculty that the new curriculum now being implemented provides positive responses to the issues raised in Findings 2, 3, and 4.

As indicated later in this assessment, a large number of students in our program have had a positive experience in undergraduate research, but some appear unaware of the opportunities. The faculty should consider if the opportunities are adequately advertised to interested undergraduates.
PART 1

Graduation Assessment for the Physics
Undergraduate BS Program in 2006

1.B. Collection of Written Responses to Questions Posed in the Exit Interview Form
for the Undergraduate BS Physics Program

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.

Student 1. “The depth of the physics curriculum is very good. The jump in difficulty
between 212 and 311 is too large though. 211 and 212 were very easy and did not prepare
me properly for 300 level courses. I found most of the “new” texts to be lacking. Serway
is not as good as Halliday and Resnick and the new Solid State text is horrible. These
problems are small compared to the positive aspects of the program.”

Student 2. “The material covered in the undergraduate courses well prepared me for
graduate school. But I was over prepared in some areas and under prepared in others. Of
course this has to do with my choice of graduate programs, and nuclear and particle
physics was not covered enough. Another thing that I felt didn’t help me after I got to
grad school was the fact that all of my fellow students had experience in an experimental
lab with a research professor. Something like a required undergraduate thesis would have
helped gain this type of experience. Or, at least more emphasis on undergraduate research
of some type would have been good. I was one of the few students I know who took any
credits in research.”

Student 3. no reply

Student 4. “The department deserves real acclaim for its professors and staff. The
professors were nearly always available to me (even sometimes in the middle of the
night) and helpful whenever I had a burning question about physics or some other thing
in the realm of science. Mary and Robert were also invaluable when it came to questions
about labs, forms, or even daily practical concerns, like what first year took the last
redvine! When an active participant of the Society of Physics Students, staff and
instructors alike helped myself and other students at every corner--- from building
Einstein's head to bad science movie nights, all were eternally supportive!”

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

Student 1. “All thoughts listed above.”

Student 2. no reply

Student 3. “The new curriculum looks great; less emphasis on the math department.”

Student 4. “Though I felt the rigor of the course work in our department was
appropriate, I often wished that the incline from sophomore to junior year were not as
steep and, in addition, that students could take classes that explored their interested
outside of the general requirements.”
PART 1

Graduation Assessment for the Physics Undergraduate BS Program in 2006

1.B. Collection of Written Responses to Questions Posed in the Exit Interview Form for the Undergraduate BS Physics Program, Continued

Optional Oral Interview (Interview notes)

Student 1. Began in engineering. Found the math to be a problem, so recommend MATH 421 before mechanics and electricity and magnetism. Had nearly all courses from two professors; need more rotation. Would prefer electronic course evaluation versus the handwritten ones, as instructors can identify the handwriting. All in all a good experience that left student well prepared for graduate school.
Part 1

Graduation Assessment for the Physics Undergraduate BS Program in 2006

1.C. Overview of Responses to the Questionnaire by the Four Students

Tabular results for the Undergraduate Outcomes Assessment Questionnaire are provided in Table 1 for the four students who submitted the questionnaire at the completion of their BS program in Physics. The upper panel gives the results, in the order the 18 questions were asked. The responses to each of the questions are: 1 (strongly disagree) through 5 (strongly agree), as defined at the bottom of the table. The mean for each of the four replies is given in the right-hand column. The lower panel of the figure presents the results again, but sorted in descending order by the mean of the four replies to each question. For 13 of the 18 questions, the mean is 4.0 or greater; agree or strongly agree. Such strong support again indicates that from an overall perspective the Physics Department and UAF are doing quite well.

Of concern is the presence of low scores, for which some intervention should be initiated within the department. The lowest score concerns the frequently heard refrain about the baccalaureate core curriculum. Even then, three students rate it as a 3 (neutral response) and only one is strongly unimpressed (strongly disagree). This is not a stinging indictment of the core curriculum. Arguments can be made from observation that the core curriculum suffers from a lack of clear definition, with students unable to articulate the purpose behind its creation and continued existence. This is not, however, a departmental issue as much as it is a UAF issue.

The second lowest area concerns the quality of TAs in the lower-division courses, but again only one ranking is below neutral. By way of analysis, all four students graduated in Spring 2006, yet entered the program separately in 2001, 2002 (2x), and 2003. An analysis of the records for each student’s early years in the program (while taking PHYS 211, 212, and 213) shows that the least and most enthusiastic students were exposed to difficult transitions in the department. In the early months of 2003 the laboratory supervisor and administrative assistant departed; additionally, the department chair resigned. The laboratory supervisor duties were largely delegated in 2002-2003 to the individual instructors. A new laboratory supervisor was in place in fall 2003. An improved outcome is expected in next year’s assessment. By way of comparison, the equivalent survey results for 2005 are included as Table 2. The four lowest scores in 2006 appear within the six lowest in 2005, thus demanding increased attention to the issue of TA quality.

The third lowest ranking in Table 1 concerns the students’ view of UAF as a whole, while the fourth is a ranking of intellectual stimulation by student peers. Lastly (fifth from the bottom), is a ranking only slightly above neutral for the physics program’s curriculum. It is the faculty’s belief that the revisions to the curriculum just now being implemented will, with time, demonstrate that our efforts have been successful.
## PART 1

**Table 1. Questionnaire, Graduation Assessment for the Physics Undergraduate BS Program in 2006**

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 I had a rewarding undergraduate research experience.</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4.50</td>
<td>4.5</td>
</tr>
<tr>
<td>11 Faculty members in the physics department provide a stimulating atmosphere.</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4.25</td>
<td></td>
</tr>
<tr>
<td>12 Faculty members in the physics department are constructively involved in education.</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>13 Faculty members in the physics department are accessible and helpful.</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td>14 My academic advisor in the physics department was accessible and helpful.</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>15 Teaching assistants in my lower-division labs were knowledgeable and helpful.</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2.75</td>
<td>4.2</td>
</tr>
<tr>
<td>16 Fellow students were intellectually stimulating.</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3.25</td>
<td></td>
</tr>
<tr>
<td>17 The physics department staff was accessible and helpful.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>18 I am prepared for the next step in my professional development.</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4.00</td>
<td>4.1</td>
</tr>
</tbody>
</table>

**Means Sorted in Decreasing Level of Agreement**

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 The physics department staff was accessible and helpful.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5.00</td>
<td>Greatest agreement</td>
</tr>
<tr>
<td>8 Class sizes in the physics classes are appropriate.</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td>13 Faculty members in the physics department are accessible and helpful.</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td>5 I can recommend my physics degree program to another student.</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td>7 The quality of instruction in the physics department is high.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td>9 Undergraduate research opportunities were available to me.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td>1 I can recommend UAF to another student.</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>10 I had a rewarding undergraduate research experience.</td>
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<td>4</td>
<td>4</td>
<td>5</td>
<td>4.50</td>
<td></td>
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<td>4.50</td>
<td></td>
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<td>11 Faculty members in the physics department provide a stimulating atmosphere.</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4.25</td>
<td></td>
</tr>
<tr>
<td>2 In general, the quality of instruction at UAF is high.</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>18 I am prepared for the next step in my professional development.</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>6 I am pleased with the curriculum in my physics degree program.</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3.75</td>
<td></td>
</tr>
<tr>
<td>16 Fellow students were intellectually stimulating.</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3.25</td>
<td></td>
</tr>
<tr>
<td>4 UAF as a whole provides a stimulating atmosphere for undergraduate study.</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>15 Teaching assistants in my lower-division labs were knowledgeable and helpful.</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2.75</td>
<td></td>
</tr>
<tr>
<td>3 I can recommend UAF to another student.</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2.50</td>
<td>Least agreement</td>
</tr>
</tbody>
</table>

1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree; blank=not applicable, etc.
## Table 2. Questionnaire, Graduation Assessment for the Physics Undergraduate BS Program in 2005

**Listed in Order from the Questionnaire**

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can recommend UAF to another student.</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td>In general, the quality of instruction at UAF is high.</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>3.9</td>
</tr>
<tr>
<td>In concept, the UAF baccalaureate core curriculum is a good idea.</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2.5</td>
<td>4</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>UAF as a whole provides a stimulating atmosphere for undergraduate study.</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>3.7</td>
<td>3.7</td>
</tr>
<tr>
<td>I can recommend my physics degree program to another student.</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.1</td>
</tr>
<tr>
<td>I am pleased with the curriculum in my physics degree program.</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.1</td>
</tr>
<tr>
<td>The quality of instruction in the physics department is high.</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>3.7</td>
</tr>
<tr>
<td>Class sizes in the physics classes are appropriate.</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>Undergraduate research opportunities were available to me.</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>I had a rewarding undergraduate research experience.</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.1</td>
</tr>
<tr>
<td>Faculty members in the physics department provide a stimulating atmosphere.</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>Faculty members in the physics department are constructively involved in</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>education.</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faculty members in the physics department are accessible and helpful.</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>My academic advisor in the physics department was accessible and helpful.</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4.4</td>
</tr>
<tr>
<td>Teaching assistants in my lower-division labs were knowledgeable and helpful.</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>3.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Fellow students were intellectually stimulating.</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>The physics department staff was accessible and helpful.</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4.7</td>
</tr>
<tr>
<td>I am prepared for the next step in my professional development.</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>4.3</td>
</tr>
</tbody>
</table>

**Means Sorted in Decreasing Level of Agreement**

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
</table>
| The physics department staff was accessible and helpful.                  | 4  | 5  | 5  | 4  | 5  | 5  | 5  | 4.7| Greatest agreement
| Class sizes in the physics classes are appropriate.                       | 4  | 5  | 5  | 5  | 5  | 5  | 4  | 4.6|
| My academic advisor in the physics department was accessible and helpful.  | 5  | 5  | 3  | 4  | 4  | 5  | 4  | 4.4|
| Undergraduate research opportunities were available to me.                | 5  | 4  | 4  | 3  | 5  | 5  | 4  | 4.3|
| Faculty members in the physics department are constructively involved in  | 3  | 4  | 5  | 4  | 5  | 5  | 5  | 4.3|
| education.                                                               | 12 |
| Faculty members in the physics department are accessible and helpful.     | 4  | 5  | 4  | 5  | 3  | 5  | 4  | 4.3|
| I am prepared for the next step in my professional development.           | 4  | 5  | 5  | 4  | 3  | 5  | 4  | 4.3|
| I can recommend my physics degree program to another student.             | 3  | 4  | 4  | 4  | 4  | 5  | 5  | 4.1|
| I am pleased with the curriculum in my physics degree program.            | 3  | 4  | 4  | 4  | 5  | 5  | 5  | 4.1|
| I had a rewarding undergraduate research experience.                      | 5  | 5  | 4  | 3  | 2  | 5  | 5  | 4.1|
| Faculty members in the physics department provide a stimulating atmosphere.| 3  | 4  | 5  | 4  | 5  | 4  | 4.1|
| I can recommend UAF to another student.                                   | 3  | 4  | 4  | 4  | 5  | 4  | 4  | 4.0|
| In general, the quality of instruction at UAF is high.                    | 3  | 4  | 4  | 3  | 5  | 4  | 3.9|
| Fellow students were intellectually stimulating.                          | 3  | 3  | 4  | 3  | 5  | 4  | 3.9|
| UAF as a whole provides a stimulating atmosphere for undergraduate study. | 4  | 3  | 3  | 4  | 5  | 4  | 3.7|
| The quality of instruction in the physics department is high.             | 3  | 3  | 4  | 3  | 5  | 4  | 3.7|
| Teaching assistants in my lower-division labs were knowledgeable and helpful. | 3  | 3  | 4  | 3  | 5  | 4  | 3.7|
| In concept, the UAF baccalaureate core curriculum is a good idea.        | 4  | 2  | 3  | 3  | 2.5| 4  | 3.1| Least agreement

1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree; blank=not applicable, etc.
PART 2

Five-Year Post Graduation Assessment for the Physics Undergraduate BS Program

2.A. Summary of Significant Findings and Our Response

Significant Findings

1. In their own diverse ways and with varying degrees of success, the four students have made use of their technical education. One graduate is completing a PhD degree program, and one is in a technical research position at a university.

2. The students appreciate their UAF degree program and are recommending our program to others.

3. The curriculum is perceived as being very good. Computer programming should be required. Instruction should include introductions to “hot topics.” There should be more emphasis on undergraduate research.

4. More effort should be directed towards career options and counseling for individuals with BS degrees in physics.

5. The small classes and instructor access were noted positively.

Department Responses to Issues for Improvement

The faculty notes the candid cooperation in this assessment activity and the continuing positive view of our undergraduate BS degree program in physics.

Based, in part, upon earlier student assessments the faculty has made modifications to the BS program. This includes a new 4-cr course, PHYS 220, Computational Physics, and a series of 1-cr “short” courses, PHYS 471-472, all of which reply directly to the “hot topics” of Finding 3.

Undergraduate research has been widely available for years with faculty members fully in the department and with joint appointment faculty. The last departmental Program Review highlighted our successes in this area. The faculty will review this finding to see if additional options are available or if increased advertising is required.

Career counseling and information on careers is acknowledged as not having been one of our strongest efforts and also note it has been highlighted in prior assessment activities. The faculty will consider this issue in the next academic year.
PART 2

Five-Year Post Graduation Assessment for the Physics Undergraduate BS Program

2.B. Distillation of Responses from the Four Students

1. Post Graduate Career
The responses display a wide variety of career choices, from more academically focused to diverse paths in technical areas. These responses indicate that all have remained within areas for which technical knowledge in the physical sciences is important.

One student is completing his PhD dissertation in Optical Science and Engineering. A second student has done consulting work, and technical work at a National laboratory, and more recently was a staff scientist, systems engineer, and laser physicist within a university environment. The two other career paths included differing jobs: laborer, computer programmer, business owner, some graduate school, and technical work at a National laboratory.

2. Career directly related to or influenced in any way by UAF degree.
The responses show their UAF degree program is acknowledged as having been useful for most of the diverse employment selections made by the four graduates. One did not perceive his work as a laborer as having been related to his academic program choice. One strongly recommended greater emphasis on undergraduate research as a part of the program.

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
One student observed that his UAF experience was “well ahead of many other (graduate) schools…” with which he has since had experience, though it should be added that he has not yet been successful in completing a graduate program. Another emphasized the need for computer programming skills and undergraduate research as part of the undergraduate education. Support was given for solid-state physics and optics in the standard curriculum, and requested senior level courses in “hot topics.”

4. Would you recommend the physics program to a perspective student?
Three stated clearly that they would and/or have done so. One discussed here the lack of information on entry-level jobs for BS recipients; information should be provided in the degree program.

5. Lasting positive and/or negative impressions of the UAF baccalaureate program.
Positive. Small class sizes, with lab-based classes noted positively, and good access to instructors. Compliments were given to instructors (two in particular) and the staff.
Negative. Several instructors were associated with “misguided authority.” Noted difficulty with mathematics in Mechanics; “strongly challenged.”
PART 2

Five-Year Post Graduation Assessment for the Physics Undergraduate BS Program

2.B. Distillation of Responses from the Four Students, Continued

6. Lasting positive and/or negative impressions of UAF and Fairbanks.
   Positive. Kooky. Enjoyed the snow at times. Appreciated undergraduate study area in the department.
   Negative. Cold and dark.

7. Things you always wanted to tell us.
   Career counseling and options are needed. An invitation was requested to return and give a colloquium as he finishes his PhD. “Thank you.”
PART 2

Five-Year Post Graduation Assessment for the Physics Undergraduate BS Program

2.C. A Summary of Comments by the Individual Students

Student 1

1. Post Graduate Career
Mixture of stay-home dad, owner of business, some graduate school in physics at two universities, and computer programmer for government facility.

2. Career directly related to or influenced in any way by UAF degree.
Physics program taught motivation and determination to succeed. It was the first time that any effort had been required; before, it had been so easy. Not currently working in a field that depends directly upon my degree program, but his training in physics has been useful, as it provides physics insight lacking in others with whom he works.

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
Observes that his UAF experience was “well ahead of many others schools…” with which he has had experience. Believes he is well prepared for graduate school in physics, to which he still aspires.

4. Would you recommend the physics program to a perspective student?
Yes, and has done so on “several” occasions.

5. Lasting positive and/or negative impressions of the UAF baccalaureate program.
Positive. Small classes in degree program. Good access to instructors at UAF. “I had a great time at UAF.”
Negative. “…have nothing to say…”.

6. Lasting positive and/or negative impressions of UAF and Fairbanks.
Believes Fairbanks is a great place to attend school. Cannot tell if he was originally from here. Gives contradictory statements about gaining independence versus advantage of attending a university close to home. Unsaid, but seems to suggest a transition; start near home and then strive for more independence.

7. Things you always wanted to tell us.
Expresses concern for career counseling. Need better emphasis on the career options after university. Need to be thinking about long-term plans. Physics is difficult at the baccalaureate level as there are not many jobs directly related to physics.
PART 2

Five-Year Post Graduation Assessment for the Physics Undergraduate BS Program

2.C. A Summary of Comments by the Individual Students, Continued

Student 2

1. Post Graduate Career
Ranges from laser technician at a national laboratory, government consultant, unemployed, staff scientist at a university, and systems engineer and laser physicist at another university.

2. Career directly related to or influenced in any way by UAF degree.
Absence of a degree would have led to much poorer options for employment, but attributes his successful employment to his undergraduate research experience and his undergraduate research advisor. Believes that it is the research experience that is important for a person holding a baccalaureate degree in physics.

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
Require all physics students to learn computer programming and do undergraduate research. Other suggestions were more related to socialization.

4. Would you recommend the physics program to a perspective student?
Yes.

5. Lasting positive and/or negative impressions of the UAF baccalaureate program.
Taught to say nice things or not speak. Considered experience “fine.” Complements several professors. Several others are associated with “misguided authority.”

6. Lasting positive and/or negative impressions of UAF and Fairbanks.
Cold, dark, pretty, little kooky, mostly realistic.

7. Things you always wanted to tell us.
“Never ever ever ever ever say , ‘All things fall at the same rate.’ They don’t…”
PART 2

Five-Year Post Graduation Assessment for the Physics Undergraduate BS Program

2.C. A Summary of Comments by the Individual Students, Continued

Student 3

1. Post Graduate Career
University graduate student, later employed at a national laboratory, and since fall 2003 a PhD student in an Optical Science and Engineering Program. Dissertation title: “Ultrafast dynamics and terahertz spectroscopy in semiconductors.”

2. Career directly related to or influenced in any way by UAF degree.
Yes.

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
Yes; gained a good foundation. Specifically mentioned approval of both Optics and Solid State Physics as part of the standard curriculum. Recommends a senior level course or seminar on “hot topics.”

4. Would you recommend the physics program to a perspective student?
Yes. Noted the small class size and open door policy of most professors. Level of instruction was “adequate.”

5. Lasting positive and/or negative impressions of the UAF baccalaureate program.
None mentioned

6. Lasting positive and/or negative impressions of UAF and Fairbanks.
None mentioned, but in an earlier comment it was stated that the cold weather “forced” one to read textbooks “carefully.”

7. Things you always wanted to tell us.
Asks to be invited to give a colloquium.
PART 2

Five-Year Post Graduation Assessment for the Physics Undergraduate BS Program

2.C. A Summary of Comments by the Individual Students, Continued

Student 4

1. Post Graduate Career
General labor and warehouse worker. Student employee and then technician at national laboratory. Now general labor.

2. Career directly related to or influenced in any way by UAF degree.
Only work at the national laboratory.

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
Employer at the national laboratory seemed to think so.

4. Would you recommend the physics program to a perspective student?
Discussed the issue of entry-level jobs available for individuals holding a BS in physics and lacking any other experience. Most physics programs do not provide training for entry-level positions. Suggests individual confidence may be an issue as well.

5. Lasting positive and/or negative impressions of the UAF baccalaureate program.
Enjoyed the lab-based classes. Mechanics was clearly a challenge to this student, who was strongly challenged by the significant use of mathematics. Enjoyed UAF. Positive comments about faculty and staff with whom he interacted; sincere interest and ability to make subjects interesting and enjoyable.

6. Lasting positive and/or negative impressions of UAF and Fairbanks.
Enjoyed snow at times, but really did not like the cold. Appreciated the student room in the department.

7. Things you always wanted to tell us.
“Thank you”
Physics Department

Annual Report of Outcomes Assessment

Graduate Programs in 2006

John Craven
Chair, Physics Department

30 May 2007
Status of the Program

This report is for the Physics Department’s 2006 graduate programs in Physics, for which there were two graduates: one in physics and one in space physics. For the purposes of this assessment, however, it is reasonable to consider the two as having been in identical programs since the course selections and research area for the graduate in physics was largely interchangeable with that of a typical space physics graduate.

There are currently 22 active students in our graduate program. Three students are on official leave in this spring semester: two for medical reasons (both at an early stage in their graduate program) and one veteran (at the time of this writing still deciding if he wants to continue). One of the new students has stated that she will definitely be back; the prospects are less certain for the other two. Five students took the PhD written comprehensive examination last fall, with three passes and two failures (each having the option to take the exam again this coming fall).

Outcomes Assessment

The primary method of assessing outcomes has been to obtain “exit interviews,” or surveys, from each graduating student. The survey is in the form of a questionnaire and a request for written comments. Invitations for personal interviews with the department chair or an alternate faculty member of the student’s choice are also offered. The results for this assessment activity are provided in Part 1 of this report for the two graduates.

An opportunity is also provided to all graduates five years later, when we present a questionnaire that includes post-graduation career choices and opinions about their UAF experience. Two of five survey questionnaires were returned this year from five-year graduates. The results for this assessment activity are provided in Part 2 of this report.

This first page presents a summary of the issues extracted from the assessment activity that require attention by the faculty at the outset of the next academic year. The basis for these issues derives from an analysis of the information gained in Part 1 and Part 2.

Each of the two parts is laid out in the same manner: summary findings followed by the underlying data. The first page of each part (Section 1.A and 2.A) contains a summary of the significant finding(s) from the data. Section 1.B provides a compact summary of the main points raised in the written comments by each graduating student. Section 1.C provides an interpretation of the results contained in the questionnaire, whose individual results are given in Table 1. For comparison, the corresponding numerical results for graduating students in 2005 are provided in Table 2. Section 2.B contains a distillation of responses by the four students who graduated five years ago; it is a summing of the individual comments. The last section, 2.C, contains summaries or direct quotes of individual written comments by the former students. Summaries are sometimes used in place of direct quotes to aid in removing specific references to faculty members.
Recommendations for Faculty Consideration

Recommendations for faculty consideration in the fall semester that follow from this assessment activity are given below.

- **Homework policy.** Do all faculty members state a clear homework policy in their syllabi and is it followed? Does the faculty wish to review and implement a departmental homework policy?

- **Redundancies in the space physics topical courses.** The course content and sequence of these four courses should be reviewed. Should the course structures be altered, including deletion of at least one course and the creation of any new courses?
PART 1

Graduation Assessment for the Physics Graduate Programs in 2006

1.A. Summary of Significant Finding and Our Response

Significant Findings

Some faculty members do not post homework solutions for problems assigned as part of the course.

Department Responses

There is no departmental policy regarding homework. That is left to the individual instructors, but must be consistent with the course syllabus. This subject area will be brought to the faculty at its first fall meeting. The syllabi can be studied to make sure that homework is treated in a manner consistent with each published syllabus.
PART 1

Graduation Assessment for the Physics Graduate Programs in 2006

1.B. Collection of Written Responses to Questions Posed in the Exit Interview Form for the Graduate Physics Programs

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.

Student 1. PhD in Space Physics

“I have seen the space physics course improve in the course of my time here. Students taking those courses now can gain more from those courses than I could in the earlier version of those courses.”

Student 2. PhD in Physics (but research work was in space physics)

“My comments are related to the previous questions. In reference to 5 (quality of instruction) most of my professors were very good; however, two were very poor. In particular, all professors should be required to post solutions to HW sets. The two poor professors I had did not do this. In reference to 15 (fellow students were stimulating), I knew several students who I enjoyed intellectually very much. Many others were not very bright. In reference to 17 (I am prepared for the next step in my professional development), I do not know what the next step is in my professional life.”

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

Student 1. PhD in Space Physics

The research program is very good in these areas in which faculty specialize, of course. That is true in any program, but especially relevant in this department because of its geographical isolation. This point should be made clear to incoming students. One wants to make sure that they have at least an inclination toward one of the research specializations of the department if possible. Most probably do; otherwise they probably would not be considering graduate study here.

Student 2. PhD in Physics (but research work was in space physics)

“Research overall is excellent. I thoroughly enjoyed the different areas of space physics research being done at the GI.”
PART 1

Graduation Assessment for the Physics Graduate Programs in 2006

1.C. Overview of Responses to the Questionnaire by the two Students

Tabular results for the Graduate Outcomes Assessment Questionnaire are provided in Table 1 for the two students who submitted the questionnaire at the completion of their graduate programs in Physics and Space Physics. The upper panel gives the results, in the order the 17 questions were asked. The responses to each question are 1 (strongly disagree) through 5 (strongly agree), as defined at the bottom of the table. The mean for each of the four replies in given in the right-hand column. The lower panel of the figure presents the results again, but sorted in descending order by the mean of the four replies to each question. For 13 of the 17 questions, the mean is 4.0 or greater; agree or strongly agree. Such strong support again indicates that, from the perspective of these two students, the Physics Department and UAF are doing quite well.

Of concern is the presence of low scores, and in this case the four lowest scores are mostly driven by one student (space physics). As to the lack of adequate research funding, this student advanced so slowly in his research work that his advisor elected to discontinue RA funding in the failed hope that this would advance the rate of work on his dissertation. The advisor is noted for his willingness to expend significant time with his students, so the lack of mentoring was not an issue. His time in graduate school was 10 years. The TA experience was apparently not rewarding, but for some years (until he elected to decline the offer and complete the research work) he made repeated use of TA funds to support himself while completing his dissertation. The slow pace at completing his dissertation was also responsible for the loss of a tenure-track position, so at the time of graduation he had yet to identify a new employment opportunity. It is could be argued that it is difficult to place too much weight on a student whose personal performance was below average.

A year later it can be reported that the physics student is now fully employed as an instructor at a Community College in Michigan and the space physics student has recently told his mentor that he has two potential job offers, one for a tenure-track position and the other a post-doctoral position.

By way of some comparison, the corresponding table from the assessments in 2005 is reproduced here in Table 2. The questions gaining the lowest rating in this year’s report can be found to have ranked decidedly better with the previous year’s much larger number of students. Further, the four questions gaining the four lowest ratings a year ago can be seen to have enjoyed higher rating this year. The tyranny of small samples continues.
Table 1. Questionnaire, Graduation Assessment for the Physics Graduate Programs in 2006

<table>
<thead>
<tr>
<th>Listed in Order from the Questionnaire, by Degree</th>
<th>PhD PHYS</th>
<th>PhD SPHY</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I can recommend UAF to another student</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>2 UAF as a whole provides a stimulating atmosphere for graduate study.</td>
<td>5</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>3 I can recommend my graduate physics degree program to another student.</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>4 I am pleased with the curriculum within my degree program.</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>5 The quality of instruction in the physics department is high.</td>
<td>4</td>
<td>5</td>
<td>4.5</td>
</tr>
<tr>
<td>6 Faculty members in the physics department provide a stimulating atmosphere.</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>7 Faculty members in the physics department are accessible and helpful.</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>8 The quality of research work in the physics department and/or GI is high.</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>9 I am pleased with the research experience in my degree program.</td>
<td>5</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>10 My graduate advisor was constructively involved in my research.</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>11 My graduate advisory committee contributed to my research experience.</td>
<td>4</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td>12 I had access to modern equipment in my research program.</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>13 My research project was adequately funded.</td>
<td>5</td>
<td>2</td>
<td>3.5</td>
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<td>4</td>
<td>3.5</td>
</tr>
<tr>
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<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
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<td>4</td>
<td>3</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Combined Means Sorted in Decreasing Level of Agreement

<table>
<thead>
<tr>
<th>Listed in Order from the Questionnaire, by Degree</th>
<th>PhD PHYS</th>
<th>PhD SPHY</th>
<th>Mean</th>
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<tbody>
<tr>
<td>1 I can recommend UAF to another student</td>
<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>3 I can recommend my graduate physics degree program to another student.</td>
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<td>5</td>
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</tr>
<tr>
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<td>5</td>
<td>5.0</td>
</tr>
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<td>5</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>12 I had access to modern equipment in my research program.</td>
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</tr>
<tr>
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<td>5</td>
<td>4</td>
<td>4.5</td>
</tr>
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<td>5</td>
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<tr>
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<td>4</td>
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### Table 2. Questionnaire, Graduation Assessment for the Physics Graduate Programs in 2005

<table>
<thead>
<tr>
<th>Question</th>
<th>MS CPHY</th>
<th>MS SPHY</th>
<th>MS PHYS</th>
<th>PhD ATM</th>
<th>Combined Mean</th>
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<tr>
<td>1 I can recommend UAF to another student</td>
<td>4 3 4 3.7</td>
<td>4 5 5</td>
<td>4.17</td>
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<tr>
<td>2 UAF as a whole provides a stimulating atmosphere for graduate study.</td>
<td>4 4 2.5 3.5</td>
<td>4 5 5</td>
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<tr>
<td>3 I can recommend my graduate physics degree program to another student.</td>
<td>4 3 3 3.3</td>
<td>5 5 5</td>
<td>4.17</td>
<td></td>
<td></td>
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<tr>
<td>4 I am pleased with the curriculum within my degree program.</td>
<td>3 4 3 3.3</td>
<td>3 3 5</td>
<td>3.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 The quality of instruction in the physics department is high.</td>
<td>5 2 3 3.3</td>
<td>3 4 5</td>
<td>3.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Faculty members in the physics department provide a stimulating atmosphere.</td>
<td>4 2 3 3.0</td>
<td>4 4 5</td>
<td>3.67</td>
<td></td>
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<tr>
<td>8 The quality of research work in the physics department and/or GI is high.</td>
<td>5 5 3 4.3</td>
<td>5 5</td>
<td>4.60</td>
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<td></td>
</tr>
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<td></td>
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<td>4 5 5 4.7</td>
<td>5 5 5</td>
<td>4.83</td>
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#### Combined Means Sorted in Decreasing Level of Agreement

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PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs in 2006

2.A. Summary of Significant Findings and Our Response

Significant Findings

1. The space physics topical curriculum contains some redundancies.

2. PhD program lacks an adequate syllabus for the written PhD examination.

3. Difficulties with the Atmospheric Science program had an impact on students.

Department Responses

1. This curricular issue has been discussed repeatedly over the years, but no adequate resolution has been found.

2. The syllabus issue was resolved about three years ago.

3. The “divorce” between the department and the Atmospheric Science program was completed about the time these students were graduating. Today, the department and separate Atmospheric Sciences program work well together.
PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs in 2006

2.B. Distillation of Responses from the Two Students

1. Post Graduate Career
   The Ph.D. graduate in Atmospheric Sciences is a senior scientist in a national independent institute for research in Norway. The M.S. graduate in Space Physics is currently a professional research assistant at a well-known U.S. laboratory in atmospheric and space physics that is part of a major university.

2. Career directly related to or influenced in any way by UAF degree.
   Ph.D. in Atmospheric Sciences. Yes, with emphasis on the research program and the resulting experience and connections. M.S. in Space Physics. Yes, because of the resulting connection that overcame the fact that a M.S. degree was simply insufficient to gain employment without knowing someone inside.

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
   Ph.D. in Atmospheric Sciences. Only took a limited number of courses; useful later. M.S. in Space Physics. Very positive words for mentor and many courses. Lack of praise for several courses as taught and pointed to some unneeded redundancies in the curriculum.

4. Would you recommend the physics program to a perspective student?
   Ph.D. in Atmospheric Sciences. Yes, but points out that program has moved from Physics Department. M.S. in Space Physics. Yes, in plasma physics and for those interested in ground-based auroral research and service work. Other universities are available for modeling and satellite observations.

5. Lasting positive and/or negative impressions of graduate school at UAF.

6. Lasting positive and/or negative impressions of UAF and Fairbanks.
   Ph. D. in Atmospheric Sciences. Positive reply for both. M.S. in Space Physics. UAF people and skiing.

7. Things you always wanted to tell us.
PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs in 2006

2.C. A Summary of Comments by the Individual Students

Student #1 PhD in Atmospheric Science

1. Post Graduate Career
   Is today a senior scientist in a national independent institute for research in the fields of information technology and Earth observation using satellite remote sensing. The institute is closely associated with a major university.

2. Career directly related to or influenced in any way by UAF degree
   “Yes, experience achieved during my graduate studies and in particular as a research assistant on the ARM program help create a valuable network and gained experience that has been the base of my continued career.”

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
   “As a Ph.D. student I did a limited number of classes but I found them most useful later.”

4. Would you recommend the physics program to a perspective student?
   “Yes, however my program (atmospheric science) is no longer under the physics department and I’m uncertain of the state of that program at UAF other than it was ridden by internal conflicts among the faculty at the time of my departure.”

5. Lasting positive and/or negative impressions of graduate school at UAF
   “Positive was a good environment among the students.
   “Negative was a few incidences of faculty conflicts spilling over and taking students as “hostages”, though I was not personally directly involved in these episodes.”

6. Lasting positive and/or negative impressions of UAF and Fairbanks
   “Fairbanks and UAF is a good place to be a student with good opportunities for activities both within the UAF through the student activities and activities organized outside UAF”.

7. Things you always wanted to tell us
   “I appreciated the always good service and support from the physics department and their secretary.”
PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs

2.C. A Summary of Comments by the Individual Students, Continued

Student #2  MS in Space Physics

1. Post Graduate Career
   Found it difficult to get work soon after graduation. For the past two years he has
   been a professional research assistant at a well-known laboratory in atmospheric and
   space physics that is part of a major U.S. university.

2. Career directly related to or influenced in any way by UAF degree
   “Yes. For the only reason that I am currently working under the supervision of a
   (UAF PhD in Physics) whom I met at UAF. I feel that without this direct connection,
   I wouldn’t have the opportunity to work here, even with the good grades I got at UAF
   and the interesting work done at UAF on the very topic I am currently working n
   now. A master’s degree probably doesn’t mean much in the U.S.” It appears as if 17
   refereed publications and a MS degree from UAF were insufficient to gain
   employment.

3. Did the Physics Department provide an adequate background in the fundamental
   physics topics?
   Very positive support for his thesis advisor and pleased with the basic courses in
   plasma physics, numerical simulations, aeronomy, space and magnetospheric physics.
   Disappointed in the absence of a course in advanced plasma physics.

   Course in auroral physics did not provide adequate context and current understanding
   of auroral physics. There was too much redundancy in three courses; magnetospheric
   physics, space physics, and plasma physics. Overall, need to improve coordination of
   course content for the four courses.

   Instructor for his courses in electromagnetic theory and time series analysis was not
   really focused and didn’t teach much in both classes.

4. Would you recommend the physics program to a perspective student?
   Yes, in plasma physics. Appears that there remains a focus on ground-based
   observations of the aurora and that they are largely in service support for researches at
   other universities. Might recommend other schools with stronger emphasis on
   physical processes through modeling and use of satellite observations.

5. Lasting positive and/or negative impressions of graduate school at UAF
   Positive. Work with my advisor. General atmosphere at UAF.
6. Lasting positive and/or negative impressions of UAF and Fairbanks
   UAF for its crowd and the skiing.

7. Things you always wanted to tell us
   Lack of an official syllabus for the PhD comprehensive. Could not tell if the material
   not covered in electromagnetic theory would have been expected for the exam. Clearly
does not like the UAF physics model for the comprehensive. Discussed the
   types of exams becoming more common, which are a significant step down from the
   UAF expectation.

   Compared favorably the UAF program in space physics with that at the University of
   Colorado.

   Very disappointed in UAF for allowing the Atmospheric Science program to fall into
   such appalling condition.
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 survey at graduation are attached herein.
A follow up survey is scheduled for five years after graduation. The department’s administrative assistant is responsible for organizing completion of all assessment surveys, with assistance from the mentoring faculty.

4.1 Yearly Assessment
The graduation exit survey questions (physics and general science) cover four general areas: UAF, the student’s degree program, program faculty, and other. They are further intended to help direct the student’s thoughts to subject areas for which written comments might follow, thus providing some background into the students thinking. One historical difficulty in assessing outcomes is the existence of several variations on this survey form over the years, even if the general direction of the questions has been maintained. The form has been stabilized into its present state.

The analysis comprises two different parts. Numerical answers to exit survey questions are tabulated by year or in the case of limited graduations, several contiguous years, and averages are taken to form a compact summary of results for the cohort. Means are derived for each of the four subgroups of question areas and overall. These results are also sorted in order of decreasing mean scores to identify the four best and least appreciated subject areas.

The second part (certainly more recently anyway) comprises a written copy of all comments by the students. The objective is to look for common themes in the comments that can represent the truly outstanding areas of difficulty or areas of current success.

In addition, each student is invited to meet with either the chair of the Physics Department or a member of the Assessment Committee for a private meeting to further discuss the department’s programs. This interview can be in confidence or notes can be forwarded to the assessment committee (with or without the student being identified); it is the student’s choice.

It is the job of the Assessment Committee to review this information and draft a yearly report to the department chair on what has been learned from the assessment of graduating seniors.

4.2 Five-year Follow-up Survey/Interview and Evaluation
This final step – the individual outcome – is crucial to a complete outcomes assessment plan. To be successful, it is necessary to not lose contact with the student. Successful students are generally easy to follow, as they remain active. Other means include alumni associations and the Physics Department’s newly formed undergraduate scholarship program, in which a concerted effort will be made in cooperation with the UAF office for Advancement Services to solicit ongoing contributions to an endowed fund.

Graduates will be contacted for a follow-up interview five years after graduation. The content of each interview along with an assessment of the student’s academic performance in the degree program will comprise the information for the follow-up
assessment. This part of the existing plan does not appear to have been implemented and no survey document has yet been created.

5.0 The Yearly Report
A yearly report of the assessment effort is prepared by the chair of the Assessment Committee and submitted to the department chair by 1 February. The committee reviews and evaluates the acquired data for the previous academic year and the five-year survey, and, based on the findings and personal judgments as to its relevance, makes recommendations to the department chair for any changes in the academic programs.

Recommendations are to be based upon clearly articulated observations by individual graduates and by themes emerging from multiple sources. An example might be repetitive comments about the basic content of a particular course over years. A more delicate example would be repetitive critical observations on an instructional method. Special handling would be required, but honest assessment by students cannot be ignored.

As to career development, the degree of professional success in later years is never a forgone conclusion. What counts in large part is if the graduate believes that his or her educational experience at UAF and in the major area in particular have been a positive benefit.

The department chair works with the drafting committee on any outstanding areas of concern. Differences of opinion are to be included in the final report. This report, with the chair’s contributions, is then forwarded by the chair to the department’s faculty for comments. Only then are copies submitted to the Dean of CNSM and to the Vice Provost for Academic Affairs. These are not for public distribution. No students’ names are included in the report.

6.0 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 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 data leading to the recommendation (or to know what is noise and what is signal).

A first report is expected by March 2005.
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 completed form (in the accompanying envelope) to the department’s administrative assistant in the Physics Department Office. She will preserve any requested autonomy and enter the information into a larger anonymous database from which the department will construct its outcomes assessment report for the Vice Provost for Instructional Affairs. A follow-up interview is planned for five years after graduation.

We would be particularly grateful if you would agree to an oral interview with the department chair or a member of the outcomes assessment committee. You can discuss this with the department’s administrative assistant, 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 students of our program.

The Physics Department’s Undergraduate Outcomes Assessment Committee
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 program to another student. __
6. I am pleased with the curriculum in my physics degree program. __
7. The quality of instruction in the physics department is high. __
8. Class sizes in the physics classes are appropriate. __
9. Undergraduate research opportunities were available to me. __
10. I had a rewarding undergraduate research experience. __

11. Faculty members in the physics department provide a stimulating atmosphere. __
12. Faculty members in the physics department are constructively involved in education. __
13. Faculty members in the physics department are accessible and helpful. __
14. My academic advisor in the physics department was accessible and helpful. __
15. Teaching assistants in my lower-division labs were knowledgeable and helpful. __

16. Fellow students were intellectually stimulating. __
17. The physics department staff was accessible and helpful. __
18. I am prepared for the next step in my professional development. __

NEXT PAGE
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!
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: 

Email Address:
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 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 completed form (in the accompanying envelope) to the General Science Program’s administrative assistant in the Physics Department Office. She will preserve any requested autonomy and enter the information into a larger anonymous database from which the department will construct its outcomes assessment report for the Vice Provost for Instructional Affairs. A follow-up interview is planned for five years after graduation.

We would be particularly grateful if you would agree to an oral interview with the department chair (Physics) or a member of the outcomes assessment committee. You can discuss this with the Physics Department’s administrative assistant, 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 students of our program.

The General Science Program’s Outcomes Assessment Committee
# UAF Departmental Exit Interview for Graduating Baccalaureate Students in the General Science Program

<table>
<thead>
<tr>
<th>Year Entered Program</th>
<th>Year Graduating</th>
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<table>
<thead>
<tr>
<th>Program Degree</th>
<th>NAME (Optional)</th>
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</thead>
<tbody>
<tr>
<td>B.S. or B.A. in General Science</td>
<td></td>
</tr>
</tbody>
</table>

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. 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. [ ]
9. Faculty members in the science departments provide a stimulating atmosphere. [ ]
10. Faculty members in the science department are constructively involved in education. [ ]
11. Faculty members in the science departments are accessible and helpful. [ ]
12. My academic advisor was accessible and helpful. [ ]
13. Teaching assistants in my lower-division labs were knowledgeable and helpful. [ ]
14. Fellow students were intellectually stimulating. [ ]
15. The science department staffs were accessible and helpful. [ ]
16. I am prepared for the next step in my professional development. [ ]

NEXT PAGE
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!
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:
Appendix C. Outcomes Assessment for Graduate Programs in the UAF Physics Department
1.0 Applicable Degrees
This assessment program is applicable to all graduate degrees for which the UAF Physics Department has responsibility. These are the MS degrees in Computational Physics and General Science and MS and PhD degrees in Physics and Space Physics. It also includes interdisciplinary degree programs for which the Physics Department is the home base. No distinction is made for the purpose of implementation.

2.0 Program Descriptions and Objectives
The objectives of each degree program in terms of academic and research 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 second or more 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.

The graduate physics curriculum at UAF is based on core foundation physics courses and specialty courses directed to areas of local interest. For the MS and PhD physics programs, the academic subjects include such core areas as classical and quantum mechanics, electromagnetic theory, and mathematical physics, as well as specialty courses such as fluid and statistical mechanics, numerical simulations, and time-series analysis. In the MS and PhD space-physics program, the focus is more on the physics of upper atmosphere, ionospheres, magnetospheres, and the interplanetary medium, with emphasis on Earth and its near environment. Here the program includes core foundation academic courses in classical mechanics, electromagnetic theory, and mathematical physics, and specialty courses such as plasma physics, auroral physics, aeronomy, magnetospheric physics, numerical simulations, and time-series analysis. The MS computational physics program places greater emphasis on computational modeling and simulation techniques, with local emphasis on processes in Earth’s environment and a reduced breadth of exposure to the core physics program. Students in all programs are provided an introduction to instructional issues through one-year service as teaching assistants in a mentored environment.

Students in the MS program elect a thesis or non-thesis (i.e., project) track. The thesis track is recommended when the short-term objective includes a good grounding in the fundamentals of physics and its applications to physical problems in a selected area of concentration, and an introductory exposure to research techniques and scientific and technical writing. In this case the longer-term objective is frequently advanced work, as in a PhD program, but can also include academic teaching at institutions in which research does not have a strong presence. The project-oriented track is recommended for students whose objective interest is in the MS as a final degree and careers that do not emphasize research but focus more on technical knowledge and writing. Here, careers include aerospace industry and government laboratories.
Outcomes Assessment for Graduate Programs in the UAF Physics Department

The PhD program requires the same solid grounding in the fundamentals of physics or space physics, and its applications, but adds an intense exposure to research techniques and scientific and technical writing. Included is a challenging requirement that demonstrates greater depth of acquired knowledge in the fundamentals through an intense written examination. Career opportunities are much broader, including academic positions at colleges and universities, and positions that lead to leadership roles in government and industrial laboratories.

3.0 Physics Department’s Graduate Program Office

The Physics Department operates a Graduate Program Office staffed by one half-time administrative secretary. Supervision of the Graduate Program Office is the responsibility of the department chair, with leadership for review of graduate applications presently provided by two faculty members (co-chairs of the graduate admissions review committee). All other faculty members participate as members of the review committee by providing individual reviewers. The program secretary maintains all departmental graduate records and carries out routine communications with the UAF Graduate School, the UAF Admissions Office, applicants for the physics graduate programs, and all current graduate students.

The well-established procedure within the Physics Department for selection of graduate students begins with a review of all submitted materials. The review committee chairs route an applicant’s complete file to three faculty members, who provide independent reviews that are based on the breadth and success of the undergraduate experience, with emphasis on outcomes in physics, mathematics, and relevant other courses (e.g., astronomy, astrophysics, etc.), the cumulative GPA, content of the applicant’s personal letter, the strength of three outside letters of recommendation, and results of the GRE examination, including the examination in physics (and the TOEFL where applicable). Each faculty member’s review is centered on substantive comments concerning the applicant’s strengths and weaknesses. No further faculty effort is requested at this stage, unless special circumstances are warranted for early research work and concomitant funding. The review committee chairs then make a recommendation for acceptance or rejection based in largest part on the content of the file and the substance of the three independent faculty reviews. The department chair confirms the decision or works with the committee chairs if another outcome is suggested. The program secretary communicates to the applicant the committee’s decision.

Because of its close association with all materials related to the application and its review, the review committee chairs and the department chair comprise the department’s assessment review committee.

4.0 Outline of the Assessment Plan
Outcomes Assessment for Graduate Programs
in the UAF Physics Department

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 assessment committee. This information represents the first formal assessment of the program from the student’s perspective. Again, the assessment committee will review the survey and interview results and then score the results using the simple 4-level scoring system excellent (3), acceptable (2), poor (1), or unacceptable (0), but in this case to rank the program from the former student’s perspective. Written, substantive comments by the graduate are encouraged to provide context for responses to survey questions.

5.4 Five-year Follow-up Survey/Interview and Evaluation

5.4.1 Process
This fourth and final step is crucial to a complete outcomes assessment plan; the professional outcome. To be successful, it is necessary to not lose contact with the student. Successful students are generally easy to follow, as they remain professionally active. Other means include alumni associations and the Physics Department’s newly formed undergraduate scholarship program, in which a concerted effort will be made in cooperation with the UAF Development Office to solicit ongoing contributions to an endowed fund.

The current plan is retained for now; graduates will be contacted for a follow-up interview five years after graduation. This part of the existing plan does not appear to have been implemented. [There is no known document for this survey, so one is being created.]
5.4.2 Outcomes Assessment

This fourth and final stage also comprises two different aspects; faculty evaluation and graduate evaluation. Each evaluation is based upon the willing participation by the graduate. The graduate’s assessment of the graduate program is gained using a standardized five-year survey and an optional interview with a member of the assessment committee (presumably by telephone). The same four-level scale is used to summarize the standardized survey. Substantive comments by the graduate are encouraged.

The assessment committee’s evaluation is based upon the success of the graduate in his or her further professional development (e.g., advancement to a Ph.D. program in the case of a MS degree student; employment satisfaction, etc.), again using a four-level scale and substantive comments.

A successful outcome does not necessarily mean that the graduate is professionally employed and actively using his educational experiences from physics. The question is more subjective; do the faculty and the student each perceive that the educational experience has further developed the individual intellectually to his or her personal and economic benefit; does the student look upon the department’s program as having been a positive influence on his or her life? This is probably not quantifiable in any simple manner.

6.0 The Yearly Report

A yearly report of the assessment effort is prepared by the chairs of the assessment review committee and submitted to the department chair by a date not yet established. The committee reviews and evaluates the acquired data and, based on the findings and personal judgment as to its relevance, makes recommendations for any changes in the academic or research programs.

Recommendations are to be based upon clearly articulated observations by individual students and graduates and by themes emerging from multiple sources. An example might be repetitive comments regarding the basic content of a particular course over years. A more delicate example would be repetitive critical observations on an instructional method. Special handling would be required, but honest assessment by students cannot be ignored. The faculty assessment of students provides a means by which relative weights can be assigned to individual student assessments; e.g., overall excellent performance and highly successful career development versus a long-term minimalist effort to just get by. The degree of professional success in later years is, however, not a forgone conclusion. Equally important can be suggestions for changes in the process of graduate student selection; e.g., insufficient undergraduate performance in a key physics course.

The department chair works with the assessment committee on any outstanding areas of concern. Differences of opinion are to be included in the final report. This report is then forwarded by the chair to the department’s faculty for comments. Only then are copies
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.
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 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
UAF Physics Department’s Exit Interview
Graduating M.S. and Ph.D. Students in Physics Programs

Year Entered Program_______________             Year of Graduation_______________

Program Degree _____________________ NAME (Optional) ___________________
M.S. or Ph.D. in Physics, Space Physics, Computational Physics

Upon graduation,
I am:

☐ Taking a job related to my area of specialization
☐ Taking a job unrelated to my area of specialization
☐ Continuing my studies in a professional/graduate school
☐ Taking a post-doctoral position
☐ Other

Please provide 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. UAF as a whole provides a stimulating atmosphere for graduate study. ____
3. I can recommend my graduate physics degree program to another student. ____
4. I am pleased with the curriculum within my degree program. ____
5. The quality of instruction in the physics department is high. ____
6. Faculty members in the physics department provide a stimulating atmosphere. ____
7. Faculty members in the physics department are accessible and helpful. ____
8. The quality of research work in the physics department and/or GI is high ____
9. I am pleased with the research experience in my degree program. ____
10. My graduate advisor was constructively involved in my research ____
11. My graduate advisory committee contributed to my research experience. ____
12. I had access to modern equipment in my research program. ____
13. My research work was adequately funded. ____
14. My experience as a TA was rewarding. ____
15. Fellow students were intellectual stimulating. ____
16. The Graduate Program Office was accessible and helpful. ____
17. I am prepared for the next step in my professional development ____

NEXT PAGE
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. Comments regarding the TA program can be included here; e.g., faculty participation, lab organization, etc.

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

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