



Office of Program Review & Assessment
400 Hal Greer Boulevard
Huntington, West Virginia 25755-2003
304/696-2494 Fax: 304/696-6612

2002

MEMORANDUM

TO: Dr. Nicola Orsini, Chair, Department of Physics
FROM: Bob Edmunds, Coordinator for Program Review and Assessment
DATE: July 31, 2003

A handwritten signature in black ink, appearing to be 'RBE'.

SUBJECT: Program Self-Study Assessment Report Review AY 2002
PROGRAM: BS Physics

1. Thank you for submitting the 5-year summary of the assessment activities for the program BS Physics. What follows will be a brief critique of the program review presentation, and some suggestions for the program to consider as it continues its assessment work in 2003-2004.
2. Overview of the data presented:
 1. Principal elements of the assessment plan: There is no formal assessment strategy.
 2. Student Outcomes: No Student outcomes were listed.
 3. Measures/Assessment Tools: No assessment tools indicated.
 4. Result/Analysis: No results or analysis listed.
 5. Action Taken: None mentioned.
 6. Use of Assessment Data. Not mentioned
 7. Assessment Chart: Chart presented, but not completely filled in.
3. The feedback loop from data collection, analysis and interpretation to the addressed faculty will be important in future reports. Specific changes in the courses, program, requirements, etc., should be well documented. Programmatic changes should be based upon careful examination of the data presented.
4. Primary Traits Analysis: As a part of our ongoing accreditation process with NCA/Higher Learning Commission, UAC has completed a chart identified as Efficacy of Assessment at the Program Level. This is based on the student academic achievement assessment levels of implementation. Here is the committee's perception of the program's Efficacy of Assessment:
 1. Learning Objectives: Level 0
 2. Assessment Measures: Level 1
 3. Feedback Loop: Level 0

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Overall Score: 0.7

Range:

Level One: Beginning Implementation of Assessment Programs	1-3
Level Two: Making Progress in Implementing Assessment Programs	4-6
Level Three: Maturing Stages of Continuous Improvement	7-9

The current report does not identify a specific plan with specific outcomes that rates the learning objectives in the level 0 category. Some assessment measures, although indirect measures at best, have been listed as well as anecdotal data from students who have pursued higher education as well as those who have entered the workforce. This gives the assessment measures a level 1. No direct feedback from assessing student academic achievement has been given; therefore, the Feedback Loop rates at a level 0. The overall score is a close to a "1" which would rate the program at Level Zero/One: Beginning stages of assessment.

5. The BA Physics Program needs to develop an assessment strategy and present a formal plan or an updated version of the plan from reports generated in 1999-2000 and 2000-2001. So, there is some assessment activity being undertaken. Please refer to those documents as you prepare your report for the AY 2004 which is due October 1, 2004.
6. One point about surveys. If there are any results from Physics graduates, they should be available to your department. Over the past several years we have only received two responses from graduates who took Physics as a major. If you do not have this information, please contact me.
7. There is a Yearly Assessment Summary that is due on October 1, 2003 for the academic year 2003. This report will chronicle assessment work done in academic year 2002-2003.
8. Thank you for your report. If you have any questions please do not hesitate to contact this office.



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2. Overview of the data presented:
 - a. Principal elements of the assessment plan: There is no formal assessment strategy.
 - b. Educational Goals: No program educational goals presented.
 - c. Measures/Assessment Tools: No assessment tools indicated.
 - d. Successful goals: No successful goals indicated.
 - e. Mastery of Essential Skills: Not mentioned.
 - f. Use of Assessment Data: Not mentioned.
 - g. Assessment Chart: Chart presented, but not completely filled in.
3. The feedback loop from data collection, analysis and interpretation to the addressed faculty will be important in future reports. Specific changes in the courses, program, requirements, etc., should be well documented. Programmatic changes should be based upon careful examination of the data presented.
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 - c. Feedback Loop: Level 0

Overall Score: 0.7
Range:

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Level One: Beginning Implementation of Assessment Programs	1-3
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**Assessment Committee Analysis of Yearly
Departmental/Program Assessment Reports
Report for the Academic Year 2001-2002
Comments for Programs with Program Reviews**

Program: BS Physics

Please note: Some programs (those with current program reviews) will not address the questions in the same order.

Assessment Report Guidelines	Evaluator's Comments
<p>6. Assessment Information: (Student and Programmatic)</p> <p>a. Summarize the principal elements of the departmental assessment plan. The plan must include elements to assess student learning and programmatic outcomes</p>	<p><i>No formal assessment strategy.</i></p>
<p>b. Provide information on the following elements:</p> <p>(1) Educational goals of the program</p>	<p><i>- Should you modify the outcomes on p. 13 of your program</i></p>
<p>(2) Measures of evaluating success in achieving goals</p>	<p><i>Surveys review as part of formal assessment</i></p>
<p>(3) Identification of the goals which are being successfully met and those which need attention as determined by an analysis of the data.</p>	<p><i>- strategy</i></p>
<p>c. Indicate how the mastery of essential skills is integrated into the departmental assessment plan and how student achievement is being measured</p>	
<p>d. Provide information on how assessment data is being used to improve program quality. Include specific examples.</p>	<p><i>anecdotal data.</i></p>
<p>e. As appropriate, provide information on a quantitatively based means of assessing the knowledge and skills of graduates against a national benchmark or a benchmark established by the institution.</p>	<p><small>(Reviewers, please note that this section is for Associate and Baccalaureate programs only.)</small></p> <p><i>_____</i></p>
<p>Is there a chart which identifies the program objectives/appropriate assessment tools/ standards/ results/ action taken</p>	<p>Yes: <input checked="" type="checkbox"/> No</p> <p><i>- not complete.</i></p>

B.S. Shipes
Marshall University
PRIMARY TRAIT ANALYSIS
NCA Levels of Implementation 2002-2003

DATE: *Spring 2003*

1. Learning Objectives

Level 0

No objectives were provided.

Level 1

Learning objectives were identified.

Level 2

Learning objectives were identified.
 They describe student behaviors.
 They are program, not class or course, objectives.
 They are clear.

Level 3

Comprehensive learning objectives are identified.
 Objectives are appropriate in number.
 They describe student behaviors.
 They are program, not class or course, objectives.
 They are clear.
 They are measurable.
 They support Marshall's educational goals.
 They span multiple learning domains.

2. Assessment Measures

Level 0

No measures were identified.

Level 1

Measures were identified.

Level 2

Measures were identified.
 They relate to the learning objectives.
 They include direct measures of student learning.

Level 3

Measures were identified.
 They relate to the learning objectives.
 They emphasize direct measures of student learning.

They are multiple.
 They emphasize direct learning.
 They focus on real-world tasks.
 They stress higher order learning.
 They are integrated in the curriculum.
 They allow performance to be gauged over time.

3. Feedback Loop

Level 0

The feedback loop was not described.

Level 1

Some data are being collected but not interpreted or not used.
 No performance expectations/standards have been established.
 Assessment is largely the responsibility of the department chair.

Level 2

Data are being collected, interpreted, and used by faculty to improve student learning.
 Performance expectations/standards have been established.
 Data are being shared by other appropriate constituents.
 Data are considered in departmental planning and budgeting processes.

Level 3

Data are routinely collected, interpreted, and used by faculty to improve student learning.
 Clear performance expectations/standards have been established for all measures.
 Data are being shared with other appropriate constituents.
 Data are an integral part of departmental planning and budgeting process.
 The improvement of student learning is central to the department.
 Assessment is a part of the culture of the department.

**Assessment Committee Analysis of Yearly
Departmental/Program Assessment Reports
Report for the Academic Year 2001-2002
Comments for Programs with Program Reviews**

Program: BS Physics

Please note: Some programs (those with current program reviews) will not address the questions in the same order.

Assessment Report Guidelines	Evaluator's Comments
<p>6. Assessment Information:(Student and Programmatic)</p> <p>a. Summarize the principal elements of the departmental assessment plan. The plan must include elements to assess student learning and programmatic outcomes</p>	
<p>b. Provide information on the following elements:</p> <p>(1) Educational goals of the program</p>	
<p>(2) Measures of evaluating success in achieving goals</p>	
<p>(3) Identification of the goals which are being successfully met and those which need attention as determined by an analysis of the data.</p>	
<p>c. Indicate how the mastery of essential skills is integrated into the departmental assessment plan and how student achievement is being measured</p>	
<p>d. Provide information on how assessment data is being used to improve program quality. Include specific examples.</p>	
<p>e. As appropriate, provide information on a quantitatively based means of assessing the knowledge and skills of graduates against a national benchmark or a benchmark established by the institution.</p>	<p><u>(Reviewers, please note that this section is for Associate and Baccalaureate programs only.)</u></p>
<p>Is there a chart which identifies the program objectives/appropriate assessment tools/ standards/ results/ action taken</p>	<p>Yes: _____ No:</p>

Physics

Marshall University
PRIMARY TRAIT ANALYSIS
NCA Levels of Implementation 2002-2003
DATE: Summer 2003

1. Learning Objectives

Level 0

No objectives were provided.

Level 1

Learning objectives were identified.

Level 2

- Learning objectives were identified.
- They describe student behaviors.
- They are program, not class or course, objectives.
- They are clear.

Level 3

- Comprehensive learning objectives are identified.
- Objectives are appropriate in number.
- They describe student behaviors.
- They are program, not class or course, objectives.
- They are clear.
- They are measurable.
- They support Marshall's educational goals.
- They span multiple learning domains.

2. Assessment Measures

Level 0

No measures were identified.

Level 1

Measures were identified.

Level 2

- Measures were identified.
- They relate to the learning objectives.
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- Measures were identified.
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Level 0

The feedback loop was not described.

Level 1

- Some data are being collected but not interpreted or not used.
- No performance expectations/standards have been established.
- Assessment is largely the responsibility of the department chair.

Level 2

- Data are being collected, interpreted, and used by faculty to improve student learning.
- Performance expectations/standards have been established.
- Data are being shared by other appropriate constituents.
- Data are considered in departmental planning and budgeting processes.

Level 3

- Data are routinely collected, interpreted, and used by faculty to improve student learning.
- Clear performance expectations/standards have been established for all measures.
- Data are being shared with other appropriate constituents.
- Data are an integral part of departmental planning and budgeting process.
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- Assessment is a part of the culture of the department.

Need to break out categories of MFEP

**Assessment Committee Analysis of Yearly
Departmental/Program Assessment Reports
Report for the Academic Year 2001-2002
Comments for Programs with Program Reviews**

Program: B.S. Physical

Please note: Some programs (those with current program reviews) will not address the questions in the same order.

Assessment Report Guidelines	Evaluator's Comments
<p>6. Assessment Information: (Student and Programmatic)</p> <p>a. Summarize the principal elements of the departmental assessment plan. The plan must include elements to assess student learning and programmatic outcomes</p>	<p>Good test!</p> <p>Need to break out competencies in core areas so elements are clear</p> <p>Any assessments / standards for progress through program?</p>
<p>b. Provide information on the following elements:</p> <p>(1) Educational goals of the program</p>	<p>no</p>
<p>(2) Measures of evaluating success in achieving goals</p>	<p>test</p>
<p>(3) Identification of the goals which are being successfully met and those which need attention as determined by an analysis of the data.</p>	<p>no data yet</p>
<p>c. Indicate how the mastery of essential skills is integrated into the departmental assessment plan and how student achievement is being measured</p>	<p>no data yet</p>
<p>d. Provide information on how assessment data is being used to improve program quality. Include specific examples.</p>	<p>no data yet</p>
<p>e. As appropriate, provide information on a quantitatively based means of assessing the knowledge and skills of graduates against a national benchmark or a benchmark established by the institution.</p>	<p><u>(Reviewers, please note that this section is for Associate and Baccalaureate programs only.)</u></p> <p>test is appropriate; can compare to national test data</p>
<p>Is there a chart which identifies the program objectives/appropriate assessment tools/ standards/ results/ action taken</p>	<p>Yes: _____ No:</p> <p>Need work on chart - are elements in Figure 5 part of MRP test?</p>

Marshall University
PRIMARY TRAIT ANALYSIS
NCA Levels of Implementation 2002-2003

BS Physics

DATE: 3-11-03

1. *Learning Objectives*

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No objectives were provided.

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Learning objectives were identified.

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Learning objectives were identified.

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Objectives are appropriate in number.

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They are clear.

They are measurable.

They support Marshall's educational goals.

They span multiple learning domains.

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No measures were identified.

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Measures were identified.

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Level 3

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They relate to the learning objectives.

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Level 3

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The improvement of student learning is central to the department.

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Wilson

BS Physics

donations of new equipment from corporations. The astronomy and nuclear physics courses need additional equipment. Equipment is considered adequate for the lower division courses.

Overall, because of the renovation and the equipment purchases for the renovated labs, the situation has improved. The faculty are concerned about maintenance costs for the new computer equipment purchased for the introductory labs.

Dr. Wilson has been provided with excellent laboratory space for his research in S153B and S154. Research laboratory space for Dr. Vaseashta is inadequate. Research space for Remote Sensing/Image Processing only requires computers but they must be updated regularly.

Room and laboratory assignments and usage are readily available from the Full Year Equivalent COS Space Survey compiled June 30, 2001.

5. Assessment Information:

a. Criteria for assessment of student performance and program quality:

We have had no formal assessment strategy. This year however, we will begin implementing an assessment examination for our majors and also coordinate with the Alumni office to begin receiving results of the university wide exit survey. The examination, the Major Field Exam in Physics (MFEP), is available at cost from the Educational Testing Service.

The following description of the MFEP is taken from the ETS website:
<http://www.ets.org/hea/mft/index.html>

- The Major Field Test program is an innovative battery of undergraduate outcomes tests that is used by schools and departments at more than 600 colleges and universities globally to measure student academic achievement and growth, and assesses the level of comprehension and problem-solving skills in all of the core subfields in physics. The content of the Major Field Tests reflects the basic knowledge and understanding gained in the core undergraduate curriculum. The tests are two-hour, multiple-choice examinations designed to assess mastery of concepts and principles as well as knowledge expected of students at the conclusion of a major in specific subject areas. They go beyond measurement of factual knowledge, however, because they also evaluate students' ability to analyze and solve problems, understand relationships, and interpret material.

MFEP percentile scores (both individual and group) are relative to nationwide averages, as provided by ETS.

c. Assessment Data to Improve Program Quality

The department has not developed a full post-assessment procedure with graduates of the program; largely because enough students from our small program have maintained

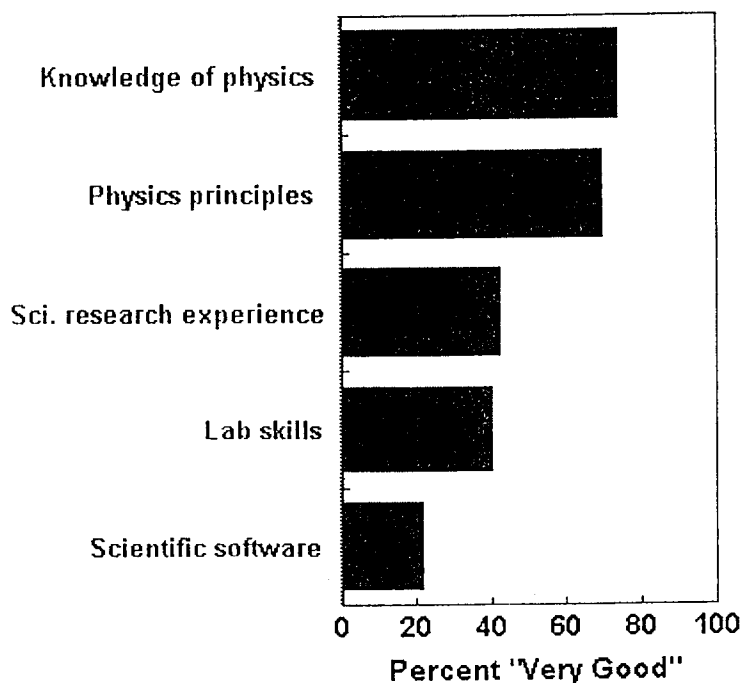
contact that we have been able to determine the high success rate in graduate school and employment mentioned above. Although we had previously planned to do so, as mentioned in earlier self-studies, we have failed to send form letters to graduates asking them to assess the preparation they have received here. We need to rectify this situation. We have also never received the annual exit survey results supplied to some departments.

d. Graduate and Employer Satisfaction:

Although we have no formal database, we informally are collectively aware that our graduates have achieved acceptance into graduate programs at major universities including University of California at Berkeley, Carnegie Mellon University, MIT, Michigan University, University of North Carolina, Ohio State University, John Hopkins University, University of Kentucky, Dayton, University of California at Irvine, WVU, Virginia, Virginia Technical University, South Carolina University, University of Cincinnati, Kansas State University, and Colorado University.

An AIP chart²⁰ below illustrates the self-reporting of United States BS-physics graduate's degree of satisfaction with their education:

Figure 5. Ratings of physics bachelors' education by those who are employed in Engineering, Math, or Science.



6. Previous Reviews:

Quoting from the 1996-1997 academic year review - "The Committee concurs with the institutional recommendation to continue at the current level of activity. The Committee

²⁰ [online] <http://www.aip.org/statistics/trends/highlite/bachplus5/figure5.htm>

is concerned over the low number of graduates in recent years. In addition to the viability issue, the Committee expressed concern over the low level of professional development activities of some faculty. These matters should be addressed in the next review.”

The low numbers of physics graduates is indeed less than desirable, but as described above, this is a nationwide dilemma and in fact, Marshall graduated more BS physics majors than WVU and, with the exception of West Virginia Wesleyan College, more than any other institution in the state, according to the most recently available data from the AIP¹. Our five-year average is 3.6 graduates per year; this is actually larger than the national average (as described below) for BS-only granting institutions, 3.2.

We have also made substantial progress in the professional development activities of our faculty as witnessed by our success at garnering external physics research grants and student coauthored research papers.

7. Strengths/Weaknesses:

The faculty are well-trained, all with earned doctorates and very experienced. The small size of the faculty and the program has allowed the students to interact regularly with the faculty, which the students view as a very positive feature. The students in the introductory survey courses have strongly benefited by our recent efforts at integrating *Interactive Engagement* techniques into the classroom and laboratory.

As noted above, with regards to the two expressed concerns of the previous Review Committee, we can say with confidence that our faculty have made impressive strides to become more research active (Appendices II and VIII) and that we are producing BS graduates at a rate superior to all other public institutions in West Virginia, and exceeding the national average for physics graduates at BS-granting-only institutions.

The faculty are also strongly committed to physics education²¹. We also can award up to \$4000 per year in scholarships to worthy physics students through donations provided by the Callahan and the Manakill families.

Finally, the newly renovated classrooms and teaching laboratories are a definite strength

Weaknesses:

One might observe from a cursory inspection of the attached abbreviated vitae of current faculty that we have no current expertise in many of the more common scholarly

²¹ With regards to the primary school science teacher preparation, in a memo dated August 20, 2002, from Professor Tony Williams, Interim Dean of CEHS to Dr. Orsini, said “Allow me to commend your department on the high quality of the faculty who teach PS 109 and 110 and on the level of instruction that our students receive. We appreciate that your Ph.D. professors teach the physical science classes that go into our teacher preparation program ...”

Chart I Assessment Summary
Marshall University
Assessment of Student Outcomes: Component/Course/Program Level
5 year summary

Component Area/Program/Discipline: Physics

Component / Course / Program Level					
Student Outcome	Person or Office Responsible	Assessment Tool or Approach	Standards/Benchmark	Results/Analysis	Action Taken
1. Demonstrate Competency in Core Areas of Physics	Department	<i>Educational Testing Service's</i> Major Fields Exam in Physics	Percentile (individual and group) relative to averages of participating universities and colleges.	NA	NA
2.					
3.					
4.					
5.					