**University Goal**

Goal #3: Academic Improvement: To provide a distinctive quality undergraduate and graduate educational experience based on challenging academic standards and exposure to new technologies.

**Program Mission/Goals**

To train undergraduate students in the fundamentals of physics so that they can develop a sound theoretical understanding with experimental skills. To produce high quality professional specialists in physics education who are committed to improving student performance and who will assist students in meeting the Florida Sunshine State Standards. The Physics Department Physics Education program endeavors to provide a quality program through the implementation of an integrated curriculum based on the guidelines and competencies aligned with the Florida Sunshine State Standards, Florida Accomplished Practices, Florida Adopted Subject Area Competencies, and those guidelines and standards from other learned societies and professional organizations.

### Outcome # 1

**Formulate Outcome**

1. Communication Skills: • Present findings of physics research orally at seminars and in writing for peer review publications. • Be able to work in school settings with varied levels of human and material resources.

**Ascertain Criteria for Success**

**Direct**

- Every graduating senior will receive a mean score of 80% in the oral presentation exit exam, graded by a team of faculty members using the presentation rubric.
- Every graduating senior will receive a mean score of 80% in the oral presentation of the report on supervised teaching experiences.

**Indirect**

- An evaluation of at least 80% of supervisors saying that FAMU graduates are equal to or surpass students from other undergraduate degree programs will be judged a success.

**Measure Performance**

**Direct**

- Students will be required to complete written lab reports and two reports summarizing their research and teaching experience results.
- Graduating seniors present their research results to their peers, The Society of Physics Students. The presentation is expected to be in PowerPoint involving graphs, tables, digital photographs of equipment, and careful analysis of data. A question and answer period follows the presentation.

**Indirect**

- After the students are placed in graduate school or positions of employment, the department chairpersons or employers will be asked to answer the question: “How well do FAMU Physics graduates communicate in written and oral form compared to their peers from other institutions.

**Observe and Summarize Results**

**Direct**

- Since the program was not active there is no data from which to draw any conclusions

**Indirect**

- Since the program was not active there is no data from which to draw any conclusions

**Use Results for Improvement**

Since the program was not active there is no data from which to draw any conclusions

**Strengthen Program (Action Plan)**

This is not required at this time

### Outcome # 2

**Formulate Outcome**

2. Critical Thinking Skills: • Demonstrate the use of higher order thinking skills through analytic reading and solving physics problems • Understand a variety of instructional/professional strategies to encourage student development of critical thinking and performance.

**Ascertain Criteria for Success**

**Direct**

- A graduating physics major will have passing grade of “C” or higher in all courses they have taken.

**Indirect**

- If 80% of employers think FAMU Physics majors compare favorably with students from other schools this will be judged a success.
### Measure Performance

**Direct**
- A graduating physics teacher major should be assessed in the areas: knowledge of the content, ability of solving problems, and knowledge of teaching methods of physics based on the grades the student receives in various course work.

**Indirect**
- Students during their sophomore and junior year summers, will participate in at least one summer research experience at FAMU or at a national lab or another university. The employers will be asked to evaluate FAMU Physics student’s critical thinking skills.

### Observe and Summarize Results

**Direct**
- Since the program was not active there is no data from which to draw any conclusions.

**Indirect**
- Since the program was not active there is no data from which to draw any conclusions.

### Use Results for Improvement

Since the program was not active there is no data from which to draw any conclusions.

### Strengthen Program (Action Plan)

This is not required at this time.

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### Outcome # 3

**Formulate Outcome**

3. Project Management:  • Collaborate responsibly and effectively with team members.  • Solve problems through skilled time management.  • Achieve objective goals through creative strategies.

**Ascertain Criteria for Success**

**Direct**
- 80% of the students are expected to get a B or better in all the core courses.  • 80% of students participating in research experiences with experimentalists in laboratories are expected to get a favorable evaluation.

**Indirect**
- If 80% FAMU Physics graduates compare favorably with other Physics graduates, this will be judged a success.

**Measure Performance**

**Direct**
- Students are given take-home exams to work out solutions collaboratively.  • Students engage in general physics and advanced physics labs as a group and write reports.  • Students have opportunity to work in research projects with experimentalists in laboratories where graduate and undergraduate students are involved.

**Indirect**
- After placement in graduate programs or positions of employment, the respective department chairpersons or employers will be asked to compare FAMU Physics graduates with Physics graduates from other institutions.

**Observe and Summarize Results**

**Direct**
- Since the program was not active there is no data from which to draw any conclusions.

**Indirect**
- Since the program was not active there is no data from which to draw any conclusions.

**Use Results for Improvement**

Since the program was not active there is no data from which to draw any conclusions.

**Strengthen Program (Action Plan)**

This is not required at this time.

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### Outcome # 4

**Formulate Outcome**

4. Specific Physics Content Knowledge  • Demonstrate knowledge and understanding of the subject matter  • Recognize and apply basic theoretical and experimental skills in the main areas of physics, including Newtonian methods, quantum mechanics, and relativity.

**Ascertain Criteria for Success**

**Direct**
- All Physics students must pass in all core and math courses with a “C” or better.  • If 80% of our students pass at the 50th percentile in the GRE test our program will be judged a success.
### Outcome # 5

#### Formulate Outcome

5. Integrity/Values: • Demonstrate self-direction in learning • Adhere to the values of science, objectivity, precision, persistence • Acquire the skills & dispositions to understand & support diverse student learning.

#### Ascertain Criteria for Success

**Direct**

- All students are expected to pass a special problems course in which they are required to conduct research on their own under the guidance of a faculty member and document their findings objectively.

**Indirect**

- A high level of integrity will be judged to exist if faculty ascertains that little or no plagiarism occurs.

#### Measure Performance

**Direct**

- Students enroll in special problems courses to conduct research on their own under a guidance of a faculty member. • Students take advanced physics lab course to perform difficult experiments. • Students are taught to present results that are not tampered to fit theory.

**Indirect**

- A student committee will do semi-annual surveys to assess the level of integrity and values of the student body. They will be asked to determine how much cheating and plagiarism occurred.

#### Observe and Summarize Results

**Direct**

- Since the program was not active there is no data from which to draw any conclusions

**Indirect**

- Since the program was not active there is no data from which to draw any conclusions

#### Use Results for Improvement

Since the program was not active there is no data from which to draw any conclusions

#### Strengthen Program (Action Plan)

This is not required at this time.

### Outcome # 6

#### Formulate Outcome

6. Supervised Teaching: Develop practical teaching skills though (a) supervised teaching physics laboratories for college level students and (b) assisting secondary and/or high-school teachers in real school environment.
<table>
<thead>
<tr>
<th><strong>Ascertain Criteria for Success</strong></th>
<th><strong>Direct</strong></th>
<th>The BS in Physics Education students must present their research findings at a joint seminar of Physics Department and College of Education.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Indirect</strong></td>
<td>An evaluation of at least 80% of faculty attending the seminar saying that the student’s supervised teaching report is of high quality will be judged a success.</td>
</tr>
<tr>
<td><strong>Measure Performance</strong></td>
<td><strong>Direct</strong></td>
<td>A student must submit 3 reports based on his supervised teaching findings to his supervisor for evaluation. Students will present their research work at a joint seminar of Physics Department and College of Education.</td>
</tr>
<tr>
<td></td>
<td><strong>Indirect</strong></td>
<td>The student’s supervisor would evaluate the quality of the supervised research work by comparison with students at similar institutions.</td>
</tr>
<tr>
<td><strong>Observe and Summarize Results</strong></td>
<td><strong>Direct</strong></td>
<td>Since the program was not active there is no data from which to draw any conclusions</td>
</tr>
<tr>
<td></td>
<td><strong>Indirect</strong></td>
<td>Since the program was not active there is no data from which to draw any conclusions</td>
</tr>
<tr>
<td><strong>Use Results for Improvement</strong></td>
<td>Since the program was not active there is no data from which to draw any conclusions</td>
<td></td>
</tr>
<tr>
<td><strong>Strengthen Program (Action Plan)</strong></td>
<td>This is not required at this time.</td>
<td></td>
</tr>
</tbody>
</table>

**Outcome #7**

**Formulate Outcome**

7. Dissemination of Research Results • Present research results at department seminars • Present and discuss results of supervised teaching experiences at a special joint Physics Department and College of Education seminar.

**Ascertain Criteria for Success**

**Direct**

Every BS in Physics education student must present his results at a joint Physics Department and College of Education seminar.

**Indirect**

80% of faculty attending the seminar or a recognition by judges at a national or regional scientific meeting will be considered a success.

**Measure Performance**

**Direct**

Three written reports that summarize the results of (1) Supervised lab teaching; physics teaching methods; and practical teaching skills.

**Indirect**

An evaluation of a student’s performance by the Principle of a secondary education setting assigned to a student.

**Observe and Summarize Results**

**Direct**

Since the program was not active there is no data from which to draw any conclusions

**Indirect**

Since the program was not active there is no data from which to draw any conclusions

**Use Results for Improvement**

Since the program was not active there is no data from which to draw any conclusions

**Strengthen Program (Action Plan)**

This is not required at this time.