Department: Physics & Astronomy  
Program: MS in Physics  
College: Science  
Website: http://physics.sjsu.edu/  

X Check here if your website addresses the University Learning Goals.  

Program Accreditation (if any): None  
Contact Person and Email: Michael Kaufman; physics-chair@sjsu.edu  

Date of Report: 5/29/15  

Part A  

1. List of Program Learning Outcomes (PLOs)  
No updates or changes.  
2. Map of PLOs to University Learning Goals (ULGs)  
No updates or changes.  
3. Alignment – Matrix of PLOs to Courses  
No updates or changes.  
4. Planning – Assessment Schedule  
No updates or changes.  
5. Student Experience  
No updates or changes.  

Part B  

6. Graduation Rates for Total, Non URM and URM students (per program and degree)  

<table>
<thead>
<tr>
<th></th>
<th>First-Time Frosh</th>
<th>UG Transfer</th>
<th>New Credential</th>
<th>1st-Time Grad.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0%</td>
<td>33%</td>
<td>0%</td>
<td>11%</td>
</tr>
<tr>
<td>URM</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Non-URM</td>
<td>0%</td>
<td>25%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

7. Headcounts of program majors and new students (per program and degree)  

<table>
<thead>
<tr>
<th></th>
<th>New FT Admit</th>
<th>New Transfer</th>
<th>Continuing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>22</td>
<td>7</td>
<td>57</td>
<td>86</td>
</tr>
<tr>
<td>BS</td>
<td>14</td>
<td>7</td>
<td>36</td>
<td>57</td>
</tr>
<tr>
<td>BA</td>
<td>2</td>
<td>0</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>
8. **SFR and average section size (per program)**

<table>
<thead>
<tr>
<th></th>
<th>SFR</th>
<th>Section Headcount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Division</td>
<td>21.5</td>
<td>40.4</td>
</tr>
<tr>
<td>Upper Division</td>
<td>13.3</td>
<td>15.5</td>
</tr>
<tr>
<td>Graduate Division</td>
<td>5.1</td>
<td>2.8</td>
</tr>
</tbody>
</table>

The SFR number for undergraduate courses is below university averages due to the large number of lab sections taught by the department. The headcount for graduate classes is anomalous, possibly because directed study (298, 299) courses are included in this average.

9. **Percentage of tenured/tenure-track instructional faculty (per department)**

The percentage of T/TT faculty is 35%, which is well below the College and University averages (54% and 43%, respectively).

**Part C**

10. **Closing the Loop/Recommended Actions**

This year we evaluated learning outcome 1.2 and 3.2 in the MS program.

1.2 Students can demonstrate an understanding of Maxwell’s equations

3.2 Students can present research in a form consistent with the AIP style manual

Student homework assignments from all 4 students in Phys 208 were collected and analyzed. These assignments typically involved the manipulation of Maxwell’s equations to derive principles of optics we have also collected student writing from our graduate lab (Physics 220) and evaluated its format and style relative to the AIP style manual.

11. **Assessment Data**

Student work on 10 homework sets was collected these homework sets required them to (among other things) derive the wave equation in anisotropic materials, in inhomogeneous materials, and in periodic materials starting from Maxwell’s equations. The work was evaluated for grading (the homework composed 40% of the course grade) as well as to track their ability to understand and manipulate Maxwell’s equations.

Analysis of student writing was done through two papers that students were required to write
on their lab experiments in Physics 220. These papers were required to adhere to the length, style, and format of a Physics Review Letter and were evaluated by their peers using the same criteria that referees for this journal are given, as well as edited for style using the AIP style guide. Students were then given a chance to revise their work to address the reviewers comments.

12. Analysis

We find that all students demonstrated a satisfactory ability to manipulate Maxwell’s equations. Students could combing the various equations and manipulate them using vector calculus identities to cast them into different forms that were more useful in describing the propagation of electromagnetic radiation, its behavior in materials, and its interaction with boundaries between materials.

For student writing, 4 out of 5 students were able to adhere to the AIP style guideline well enough for their first paper to be rated “acceptable for publication” by the peer editors, with the one exception being an undergraduate student who was taking this graduate class and had not yet been exposed to the graduate program. For both the second paper and the final revisions, all submissions were deemed to satisfactorily adhere to the AIP style manual.

13. Proposed changes and goals (if any)

Based on the analysis we feel no changes are necessary. Students are being well prepared to meet these learning outcomes in our graduate program, and the courses were they were assessed are reinforcing and further developing these learning outcomes. Given the small sample size of the data we will continue to monitor the performance on these learning outcomes to ensure that our data was typical of the (slightly) larger pool of graduate physics students.