**Sinclair Community College**

**Continuous Improvement Annual Update 2012-13**

**Please submit to your dean and the Provost’s Office no later than Oct. 1, 2012**

**Department:** 0359 – Physics

Year of Last Program Review: FY 2011-2012

Year of Next Program Review: FY 2016-2017

**Section I: Department Trend Data, Interpretation, and Analysis**

**Degree and Certificate Completion Trend Data – OVERALL SUMMARY**

Please provide an interpretation and analysis of the Degree and Certificate Completion Trend Data (Raw Data is located in Appendix A*): i.e. What trends do you see in the above data? Are there internal or external factors that account for these trends? What are the implications for the department? What actions have the department taken that have influenced these trends? What strategies will the department implement as a result of this data?*

The department of Physics and Astronomy has had two areas of emphaisis, Physics and Computational Physics. However, the majority of our students either transfer to a four year institution or take our courses to satisfy other degree or program requirements at Sinclair. The Computational Physics courses were not offered during FY10-11 due to lack of enrollment and the Physics area of emphasis was deactivated. The department is working to revive the Physics emphasis and hopes to increase enrollment in that area in the coming years. There is more demand for the PHY 220X sequence which indicates that there might be a body of students, albeit small, who might declare their intention to complete the Physics area of emphais.

**Course Success Trend Data – OVERALL SUMMARY**

Please provide an interpretation and analysis of the Course Success Trend Data (Raw Data is located in Appendix A). Looking at the success rate data provided in the Appendix for each course, please discuss trends for high enrollment courses, courses used extensively by other departments, and courses where there have been substantial changes in success.

It is encouraging to note that the department's success rate is higher than both the SME division and the collegewide success rates. The overall success rate of the online astronomy courses remains over 70% while the Physics courses are above 80%.

The online astronomy courses are very structured with the course material apportioned in appropriate chunks that the students are expected to master. We have experienced, dedicated full and part time faculty who are adept at delivering the material in this format and we expect this trend to continue. Enrollment, in these courses, has tripled subsequent to the development of online courses.

Considering that Physics is Math intensive and a lot of our students do not have much prior background in the subject area, we enjoy high succes rates. This is in part due to integration of the lecture and laboratory components of certain courses. We have anecdotal evidence of students who prefer to take our Physics courses for this reason. The Physics Resource Lab provides additional support for students outside of the classroom and is valued highly by students who make regular use of it.

Please provide any additional data and analysis that illustrates what is going on in the department (examples might include accreditation data, program data, benchmark data from national exams, course sequence completion, retention, demographic data, data on placement of graduates, graduate survey data, etc.)

The Astronomy Diagostic Test is a national assessemnt tool that is administered to students after a semester of Astronomy. This test was administered to our students in the face-to-face classes during the academic year 2011-2012. Our success rates average 59% which is above the national average of 50%. This is due to our dedicated faculty who keep up with all the latest discoveries in a field that is ever changing.

**Section II: Progress Since the Most Recent Review**

Below are the goals from Section IV part E of your last Program Review Self-Study. Describe progress or changes made toward meeting each goal over the last year.

|  |  |  |
| --- | --- | --- |
| **GOALS** | **Status** | **Progress or Rationale for No Longer Applicable** |
| A few years ago, a part timer who had a strong background in space weather and meteorology worked with a full time faculty member to develop a Weather and Climate course. Because this part timer left abruptly this effort was never completed. The department is still of the opinion this course would provide a fantastic opportunity for students needing a general education laboratory based science course at the conceptual level. Once this course has completed two to three successful offerings, it would be a perfect candidate for the online delivery format. The department’s rationale is simple. There is a vast amount of online resources for the course as well as the laboratory is the world around us. | In progress [x] Completed [ ] No longer applicable [ ]  | A couple of faculty members applied for a Learning Challenge Grant last year in an effort to get funds to obtain some training in this field and to develop this course. However, they could not procure the funds and the effort has been postponed until semester conversion is complete. We do plan to pursue this effort during the next academic year.  |
| The department intends to expand and improve its integrated lecture and laboratory offerings. This will include further imbedding laptop based computer activities into the courses as well as a new technology called the Vernier LabQuest. The department has purchased 24 of these units because they provide a less complicated and less intimidating platform than the laptops. That makes them a worthy technology to further improve the quality of the conceptual physics offerings. | In progress [x] Completed [ ] No longer applicable [ ]  | While the department continues to be in favor of integrated lecture and laboratory offerings for educational reasons, we might be forced to scale back the number of courses and sctions where course material is presented in this modality due to the necessity of full time faculty having to meet load. With semester conversion, lower overall enrollment, and integrated lecture/lab offerings, the total number of credit hours offered by the department has decreased. We will continue to watch enrollment trends during Spring semester 2013 and proceed accordingly. The technology that was purchased will be used in the classroom regardless of the mode of presentation.  |
| The conversion of the Introduction to Physics course will begin in the Fall 2012. This effort is very large but will serve as another model for the delivery of laboratory based science in the online format. | In progress [x] Completed [ ] No longer applicable [ ]  | Initial consultation with Distance Learning has taken place and a schedule is in place to proceedwith this venture. The course and associated lab is scheduled to go live, online, in Fall 2013.  |
| It is the department’s plan to create an online format for the Problem Solving in Physics with Matlab. This course has a strong enrollment and is held with high regard with students. The department hopes to use this course to possibly rekindle interest in the other Computational Science courses. | In progress [ ] Completed [ ] No longer applicable [x]  | The plan to convert this course into an online offering has been postponed for the time being. Art Ross was the instructor of record for this course since its initiation and was going to work on the conversion. However, he is unable to proceed with this effort at this time due to health reasons.  |

Below are the Recommendations for Action made by the review team. Describe the progress or changes made toward meeting each recommendation over the last year.

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| --- | --- | --- |
| **RECOMMENDATIONS** | **Status** | **Progress or Rationale for No Longer Applicable** |
| It does not appear that the department has fully addressed the recommendations from the last Program Review. Those previous recommendations are listed below. In addition to prioritizing the recommendations from the current Program Review, priority should also be given to taking action on the previous items which are listed below. * + Clarify for the department the steps needed to expand and formalize an assessment plan. Continue development and implementation of the department’s assessment plan, and report on progress annually. Make more extensive use of data to improve assessment.
	+ Consider developing a formal advisory mechanism to provide regular feedback and assistance to the department. Include regular feedback from area universities as well as Sinclair Community College.
	+ Continue work to support the development and performance of part-time faculty.
	+ Review the department’s curriculum and update as needed. Please note:
		- Many of the existing courses, as reflected by Master Syllabi, have not been revised since 1995.
		- The new Curriculum Management Tool will be a useful assist in expanding assessment practices.
		- Evaluate the need for PHY 133, 270 and 295 given the low enrollment in these courses over the past five years; deactivate if appropriate.
		- Incorporate General Education learning outcomes as appropriate.
	+ The department appears to have an opportunity to expand offerings for teacher education, transfer and Allied Health. The department should pursue this opportunity and request resources as needed.
 | In progress [x] Completed [ ] No longer applicable [ ]  | (1)The department met with Jared Cutler and upon his recommendation is in the process of finalizing a set of department outcomes which will be assessed during Spring 2013. Common assessments will be administered to students across different sections of the same course. Once this effort is in motion, we will commence work on drafting an assessment plan to assess course and general education outcomes.(2)We have an excellent professional relationship with the Physics Department at Wright State University and enjoy a similar realtionship with the University of Dayton's Physics Department. We can form an advisory board in conjunction with these partners and faculty from Sinclair.(3)We offered a workshop on implementing inquiry methods and hands-on activitites in the classroom to both full and part time faculty. This is a first step towards providing pedagogical support for part time faculty. We intend to work closely with them to align the curriculum across all sections of a course. Once an assessment plan is in place, we intend to work with them, on a one-on-one basis if necessary, to successfully implement it in their classrooms.(4) Master syllabi of all courses have been revised for semester conversion.PHY 133, 2870 and 295 have been deactivated.(5)The Early Childhood Education Department has been working on offering an associate's degree in ECE and we have been working with them to help fulfill the science requirements. Progress has been slow due to semester conversion.  |
| The department should focus on the development of department/program outcomes. While this is a “service department” that will not have any programs in semesters, the department should still focus on developing appropriate, measurable outcomes and then performing assessment to see if those outcomes are being achieved. The department should work closely with its divisional Learning Liaison and the Director of Curriculum and Assessment in developing these department outcomes, which will then become the outcomes that are used in future Annual Updates and Program Reviews. | In progress [x] Completed [ ] No longer applicable [ ]  | We have been meeting as a department to (1) Formulate a set of department-wide objectives, that are applicable to all courses and sections (it is possible that distinctions will be made between PHY and AST courses).(2) Design a mechanism to assess these objectives. At present the preferred mechanism is using common exam questions across sections of a course which will be evaluated using a rubric. The topic is , however, being actively discussed. |
| In conjunction with the development of Department/Program Outcomes, the department should make development of an assessment plan a top priority. A crucial first step in this plan will be development of common measures across all sections of a course. This may take the form of common assignments, common exams, or perhaps some common items on certain exams, but a consistent set of data needs to be collected from all sections of a course that will allow the department to demonstrate student learning in terms of both course outcomes and program/department outcomes. Again, it is recommended that the department work closely with its divisional Learning Liaison and the Director of Curriculum and Assessment in developing this assessment plan. | In progress [x] Completed [ ] No longer applicable [ ]  | As a first step, the department is focussing on finalizing and implementing the department outcomes. Once that is inplace, we intend to commence work to develop common exam questions that can be used across all sections of a course to assess the outcomes of the course. We hope to commence work on this during Spring semester, 2013.  |
| It would appear that there is room to engage adjuncts more and provide an increased level of oversight. The department should seriously consider development of common syllabi for courses that adjunct faculty can use to ensure they stay within the bounds of the curriculum. The department might explore use of the new Teaching Syllabus Tool to this end. Additional training of adjuncts appears to be in order, especially in improving their readiness to teach an integrated lecture-lab format.  | In progress [x] Completed [ ] No longer applicable [ ]  | The department has started the process of training the adjuncts to alternate appraches to curriculum. A workshop was offered where the focus was on using inquiry methods and hands-on activitties in the classroom.  |
| In order to fully align with four-year institutions, it must be determined that there is alignment within the department. The conversion to semesters provides a great opportunity to hit the ”reset” button in this area, leading to greater consistency across the department. | In progress [x] Completed [ ] No longer applicable [ ]  | We are planning a series of department retreats where the focus will be alignment of curriculum within various sections of similar courses and development of an assessment plan. We hope to have all faculty, full time and part time, who teach the same course, in the same room discussing these issues and finding common ground.  |
| Relating to the recommendation above, the department should strengthen its relationships with external institutions, seek external input into departmental changes under consideration, and ensure alignment with four-year programs. It is recommended that the department explore the development of an Advisory Committee to assist in this regard, as was suggested in the previous Program Review recommendations. | In progress [x] Completed [ ] No longer applicable [ ]  | The department has strong ties with the Physics Departments of both Wright State University and University of Dayton. We hope to extend our partnerships with other area institutions in the coming years. We also are working on the development of an Advisory Committee.  |
| The Physics Resource Laboratory holds great promise in terms of increasing student success, but there is a lack of evidence that the lab does indeed improve student outcomes. The department should begin collecting data to determine the impacts of the lab on learning. This could be a real “flag waving” opportunity for the department that would validate the efforts and resources being devoted there. The department is encouraged to collect full ID numbers and reasons students are visiting as they enter the PRL, and to use that data to document student use and any increases in student success associated with use of the PRL. | In progress [x] Completed [ ] No longer applicable [ ]  | Following the suggestion of the Dept. Review Committee, the survey that was being administerd to students to guage the usefulness of the PRL was revised and this revised survey was administered to students during Summer quarter, 2012. Of the 66 students who participated in the survey, 47% stated that the PRL provided "high quality" help. The overall results indicate that students mainly use the PRL to get help with homework and make up missed work. A revised sign-in system is in place whereby student ID numbers (Tartan card numbers) are being collected. The next step is to devise a plan that might measure the correlation between student success and student use of the PRL.  |
| There is a considerable amount of external research to support the integrated lecture/lab approach. The department may choose to buttress this with internal comparisons between sections that take this approach and those who don’t. If the data indicates that student success is substantially increased by this approach, then the department should scale this approach to encompass all lecture/lab sections it offers. If professional development is required for faculty to appropriately implement this approach, it is recommended that training be done so that all faculty can use it effectively. | In progress [x] Completed [ ] No longer applicable [ ]  | Full-time faculty who regularly teach physics courses are now acclimated to the integrated lab/lecture format. The PHY 14x and 13x series (quarters) have been in this format for more than 25 years; part-time faculty who teach these courses are therefore also acclimated. In the last 5 years we have expanded this model to the PHY 10x (now 110x) conceptual physics classes and the PHY 20x (now 220x) classes. Most sections of these courses are already taught by full time faculty using the integrated model. The challenge lies in scaling the model across those sections taught by part-time faculty. We are currently working on two efforts related to solving this problem:(1) Revisions to the lab handouts used in the conceptual physics courses (110x) to induce more engagement and exploration by students. The goal being to reduce the reliance on lecture to convey content and offer part-time instructors alternatives to the standard lecture/traditional lab model. As a result, more class time can then be spent on activities. Part-time faculty need curriculum that models alternate approaches to classroom management in order to be successful in an integrated lab/lecture environment.(2) Professional development sessions for part-time faculty including the revival of an annual department retreat. Regarding measuring success rates pre and post integrated lab/lecture for the 10x and 20x sequences the department is attempting to retrieve the relevant data. It should be noted that the revision in scheduling was not undertaken to solve a particular problem with attrition, but rather to enhance the educational quality of the courses based on research supporting this approach in the literature.   |
| There has been a tremendous emphasis on STEM areas for several years now. The department may want to thoughtfully explore whether an associate degree program should be developed that would allow for smooth transfer into a four-year Physics program. There is every indication that there will be growth in opportunities for those holding baccalaureate degrees in STEM fields, and the department may want to position itself to be part of that pipeline in Physics.  | In progress [x] Completed [ ] No longer applicable [ ]  | This is an area that certainly is worthy of exploration and we plan to pursue this once semester conversion is complete and an assessment plan is in place.  |

**Section III: Assessment of General Education & Degree Program Outcomes**

The Program Outcomes for the degrees are listed below. **All program outcomes must be assessed at least once during the 5 year Program Review cycle, and assessment of program outcomes must occur each year**.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **General Education Outcomes** | To which degree(s) is this program outcome related? | Year assessed or to be assessed. | Assessment MethodsUsed | What were the assessment results? (Please provide brief summary data) |
| Oral Communication | All programs | **2011-2012** | Students were required to work on various projects and present their findings to the class. | Oral communication was not assessed separately. An overall grade was assigned for the projects. |
| Written Communication | All programs | **2011-2012** | Students are required to write papers, answer short conceptual questions and engage in discussion forums in online classes.All the online assessments for the astronomy courses have been linked to course outcomes and data is being gathered starting Fall 2012.. | We will provide data as soon as it is available. |
| Critical Thinking/Problem Solving | All programs | **2012-2013** |  |  |
| Values/Citizenship/Community | All programs | **2013-2014** |  |  |
| Computer Literacy | All programs | **2014-2015** |  |  |
| Information Literacy | All programs | **2015-2016** |  |  |
|  |  |  |  |  |
| **Program Outcomes** | To which course(s) is this program outcome related? | Year assessed or to be assessed. | Assessment MethodsUsed | What were the assessment results? (Please provide brief summary data) |
| UNDER DEVELOPMENT |  | N/A | N/A | N/A |

**General Education Outcomes**

1. Are changes planned as a result of the assessment of general education outcomes? If so, what are those changes?

Data is being gathered in the online astronomy courses this semester and will become available once the semster has been completed. There are no changes planned since this effort was commenced this semester. The department is working on a cohesive plan to assess general education outcomes, course outcomes along with department outcomes in the Physics courses. To successfully assess all these outcomes in the coming year will be a monumental task. We are focussing on assessing department outcomes this year and will tackle the task of assessing general education outcomes next year.

1. How will you determine whether those changes had an impact?

See above.

**Program Outcomes**

1. Are changes planned as a result of the assessment of program outcomes? If so, what are those changes?

We are primarily a "service department" and therefore do not belong to any particular program. As stated earlier, the department is in the process of developing department outcomes and plans to incorporate common assessment tasks across sections of a particular course. We hope to be able to present some preliminary data for the next annual update.

1. How will you determine whether those changes had an impact?

See above.

**Improvement Efforts**

1. What were the results of changes that were planned in the last Annual Update? Are further changes needed based on these results?

See above.

1. Are there any other improvement efforts that have not been discussed in this Annual Update submission?

See above.

**APPENDIX – PROGRAM COMPLETION AND SUCCESS RATE DATA**

**Degree and Certificate Completion**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Department | Department Name | Program | FY 07-08 | FY 08-09 | FY 09-10 | FY 10-11 |
| 0359 | Physics | CPHYE.AS | . | 1 | 1 | . |
| 0359 | Physics | PHYE.AS | 1 | 2 | 1 | 1 |

**Course Success Rates**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Department | Department Name | Course | FY 07-08 | FY 08-09 | FY 09-10 | FY 10-11 | FY 11-12 (excludes Spring) |
| 359 | Physics | AST-101 | 66.7% | 69.6% | 67.4% | 66.7% | 76.6% |
| 359 | Physics | AST-107 | . | . | . | . | . |
| 359 | Physics | AST-111 | 70.8% | 63.1% | 63.1% | 64.4% | 64.9% |
| 359 | Physics | AST-112 | 91.3% | 86.4% | 83.8% | 89.3% | 82.8% |
| 359 | Physics | AST-113 | 88.1% | 85.9% | 78.1% | 72.5% | 73.3% |
| 359 | Physics | AST-117 | 71.8% | 62.5% | 64.8% | 64.0% | 65.3% |
| 359 | Physics | AST-118 | 88.2% | 80.0% | 84.2% | 87.2% | 82.8% |
| 359 | Physics | AST-119 | 88.1% | 82.2% | 79.8% | 78.6% | 73.3% |
| 359 | Physics | AST-297 | . | . | . | . | . |
| 359 | Physics | PHY-100 | 80.6% | 83.8% | 80.2% | 80.9% | 81.4% |
| 359 | Physics | PHY-104 | 78.6% | 95.5% | 75.8% | 76.7% | 62.5% |
| 359 | Physics | PHY-106 | 77.4% | 83.1% | 61.3% | 80.0% | 85.7% |
| 359 | Physics | PHY-107 | . | . | . | . | . |
| 359 | Physics | PHY-110 | . | . | . | . | . |
| 359 | Physics | PHY-119 | . | . | . | . | . |
| 359 | Physics | PHY-131 | 74.8% | 73.5% | 78.6% | 64.8% | 86.7% |
| 359 | Physics | PHY-132 | 90.6% | 100.0% | 90.9% | 91.4% | 100.0% |
| 359 | Physics | PHY-141 | 67.6% | 80.2% | 78.3% | 85.0% | 87.1% |
| 359 | Physics | PHY-142 | 86.0% | 87.7% | 77.8% | 85.5% | 91.2% |
| 359 | Physics | PHY-143 | 84.0% | 90.9% | 86.9% | 86.0% | 97.1% |
| 359 | Physics | PHY-201 | 72.7% | 72.2% | 81.9% | 78.8% | 84.0% |
| 359 | Physics | PHY-202 | 84.0% | 88.8% | 92.2% | 91.3% | 86.8% |
| 359 | Physics | PHY-203 | 87.1% | 83.7% | 90.0% | 92.2% | 89.9% |
| 359 | Physics | PHY-207 | . | . | . | . | . |
| 359 | Physics | PHY-208 | . | . | . | . | . |
| 359 | Physics | PHY-209 | . | . | . | . | . |
| 359 | Physics | PHY-210 | . | 83.3% | 87.1% | 76.5% | 89.5% |
| 359 | Physics | PHY-212 | . | 100.0% | . | . | . |
| 359 | Physics | PHY-220 | 100.0% | 100.0% | . | . | . |
| 359 | Physics | PHY-245 | . | 100.0% | . | . | . |
| 359 | Physics | PHY-297 | 100.0% | 100.0% | 100.0% | . | . |
| 359 | Physics | SME-110 | . | . | . | 70.4% | 69.2% |