**Sinclair Community College**

**Continuous Improvement Annual Update 2015-16**

**Please submit to your Division Assessment Coordinator / Learning Liaison for feedback no later than March 1, 2016**

**After receiving feedback from your Division Assessment Coordinator, please revise accordingly and make the final submission to your dean and the Provost’s Office no later than May 2, 2016**

**Department:** **SME - 0359 - Physics**

Year of Last Program Review: FY 2011-2012

Year of Next Program Review: FY 2016-2017

**Section I: 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. Responses from the previous year’s Annual Update are included, if there have been no changes to report then no changes to the response are necessary.

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| **GOALS** | **Status** | **Progress or Rationale for No Longer Applicable** |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 | In progress  Completed  No longer applicable | Since OBR has changed the general education requirements for non-science majors, we no longer have the audience for this course. The department already offers four laboratory-based science courses that fulfill general education requirements and two of them are offered in the online as well as face-to-face formats with a third one being developed for online delivery. The department is of the opinion that focusing our efforts towards increasing enrollment, engagement and success rates of the current courses will be more beneficial to our students. |
| 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  Completed  No longer applicable | Though the department does not have any current plans to expand its integrated lecture and laboratory offerings, we are in the process of revising labs for PHY 1110, PHY 114X and PHY 220X sequences. This is an ongoing effort and the LabQuests can be used in all these courses.  One of our faculty members, Doug Bradley-Hutchison, has been working on revising the PHY 2207 and 2208 labs and making the lab program more robust. In the past, all sections of the same lab course were not using/doing all the same labs. This is no longer the situation and the uniformity provides more data to gauge the success of the lab program and facilitates equipment purchase and “setting up” for the labs. This effort is still ongoing.  The revision of PHY 2207 and 2208 labs is complete. We have offered the revised labs during Fall 2015 and Spring 2016. Master shells have been created in eLearn and the revised labs have been uploaded to the shell. All part time faculty who teach these courses have access to the shells and all lab sections for each course do the same labs providing uniformity in the lab program. These labs provide a good segue to teaching the content in an integrated lab-lecture setting. We held a professional development session for all full and part time faculty and the Physics resource Lab tutors to get them familiar with the new labs and the purpose behind the structure and organization of the labs. Surveys were administered to select sections of these courses to determine how well the labs are integrated with the lectures and the preliminary results indicate that integration is not occurring uniformly. More professional development and support is necessary for our adjuncts and perhaps a revision of the survey is also called for. |
| 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 | This effort is underway. Progress has been made with the lab development. Work on the course development has been temporarily halted due to schedule constraints. It will resume in Jan. of 2014. But this also provides the chance to focus more fully and devote more time to the lab development. This offering is scheduled to go live in Fall 2014.  The online development of the course has been completed. A few small adjustments are still being made. The online development of the labs has also been completed. However, there are still a number of technical issues that are being worked out and additional discussion forums will be added during summer 2015. Both the course and lab were offered in Fall 2014 with limited success. We expect the success rate to improve after revisions are made in summer and the course and lab are offered again in Fall 2015 using the new LMS – eLearn.  The course and lab (PHY 1100 and 1110) were converted to be compatible with eLearn during summer of 2015 and were offered during Fall 2015 and Spring 2016. There are a number of technical issues that have surfaced due to conversion to eLearn in the labs. In spite of these issues, the success rate was 87.5% for this course during Fall 2015. Some of the issues were fixed last semester and the rest will be fixed during summer of 2016. The success rate during Fall 2014 and Spring 2015 averaged 42.5% in comparison. About half a dozen Adobe Connect sessions were offered to the online class during Spring 2015. This was the only difference in how the course was taught when compared to the previous times it was offered. |
| 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 | 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. |

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. Responses from the previous year’s Annual Update are included, if there have been no changes to report then no changes to the response are necessary.

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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  Completed  No longer applicable | Please see the section on assessment where we have reported the progress made during the last academic year.  Assessment data for 2014 – 2015 academic year is reported in the section on assessment below.  The semester conversion task was huge and we had to reconsider and regroup our course offerings to meet the students’ needs as well as to fulfill the contractual obligations of our faculty. Hence the task of forming an advisory committee was postponed but is underway as we speak.  We are in the process of putting together s physics program and the task of forming an advisory committee is underway and will be completed by mid-fall 2015. Once the program has been formulated, an advisory committee will be of tremendous value in providing input on the strength of the program.  Part time faculty were invited and attended some pedagogical discussions during Faculty Learning Days. In addition to collecting syllabi, we have instituted a new policy of requiring them to submit exams and grade distributions so feedback and support can be provided as needed. Also, strong mentoring was provided to new adjunct faculty, their classrooms were visited and feedback was provided. We are continuing our efforts in this direction and hope to have more to report next year.  Part time faculty were invited and attended a Saturday session (1/17/2015) that was devoted to addressing pedagogical issues such as how to teach integrated lab/lectures, developing critical thinking and problem solving skills, and writing across the physics curriculum.  The curriculum for most of our courses have been revised and updated and the low enrollment courses have been discontinued.  The department has been engaging in conversations with Wright State University to revive our teacher education offerings but so far has not been very successful. The lack of success is partly due to the fact that the Ohio marketplace is flooded with elementary teachers and job prospects are not stellar. WSU is experiencing a drop in enrollment as well.  We have just commenced some preliminary discussions with Mathematics, Biology and Chemistry departments at SCC to put together a STEM program for early childhood education majors. With the current interest in offering a 4-year degree in this area, this effort is gaining more momentum.  We have reactivated the physics program of study. This program was deactivated when we converted to semesters. Research indicates that about 10-12 students declare themselves as physics majors and we are not capturing this population. We have formulated the curriculum, completed and submitted the necessary templates for reactivating the program in CMT. It is expected o go live in Fall 2016.  We pursued the STEM program of study but met some internal barriers to progress. As a result, this effort is at a standstill. |
| 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  Completed  No longer applicable | We started working on this during Fall 2012. Developing a formal plan for assessing individual courses as well as overall departmental outcomes was a huge task. Now that the assessment plan is in place, we intend to turn our attention to completing the formulation of departmental outcomes and developing assessments to measure the same.  Program outcomes will be developed as part of the degree program requirements. Work is ongoing in this area and we expect to have it completed by mid-Fall 2015.  Program outcomes were developed after soliciting examples from the Director of Curriculum and Assessment and have been vetted by the Learning Liaison. These outcomes have been submitted and entered into CMT as part of the program description. |
| 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  Completed  No longer applicable | Common assessment questions were administered across all sections of PHY 1106 and PHY 1100, Student names and course numbers were removed from the students’ papers and were graded by FT faculty using a rubric. Sample graded papers were exchanged amongst faculty and re-graded to ensure reasonable consistency in grading.  43% of the students had a perfect score, 60% scored 80% or better and 70% scored 60% or better.  In addition assessments were administered in PHY 2201. 62% had a perfect score, 76% had 80% or better and 24% scored 60% or below.  Common assessment questions were administered across all sections of PHY 1106, PHY 1100, and PHY 2201. Reports for Fall 2015 are included below. These assessments are being administered this semester (Spring 2015) as we speak but results are not available yet.  In PHY 1106, 34% of the students who took the assessment had perfect scores, 66% had 70% or better and the average score was 71%.  In PHY 1100, 38% of the students who took the assessment had perfect scores, 75% had 70% or better and the average score was 78%.  In PHY 2201, 35% of the students who took the assessment had perfect scores, 75% had 70% or better and the average score was 68%.  In the face-to-face AST 1111, the average score was 47.5% and in AST 1112 the average score was 70%.  In PHY 1106, 22% of the students who took the assessment had perfect scores, 51% scored 80% or better and the average score was 66% for the calendar year 2015.  In PHY 1100, 30% of the students who took the assessment have perfect scores, 52% scored 80% or better and the average score was 70% for the calendar year 2015.  In PHY 2201, 26% of the students who took the assessment have perfect scores, 41% scored 80% or better and the average score was 58% for the calendar year 2015.  In AST 1111, the mean score on the assessment was 43% and 56% of the students who took the assessment scored average or above average.  In AST 1112, the mean score on the assessment was 56.5% and 57% of the students who took the assessment scored average or above average.  We were charged with assessing the information literacy component of general education in our PHY 2201 classes. 70% (38/54) of students successfully met the standard of scoring 80% or better on this assessment.  The Math Department was charged with assessing Critical Thinking and Problem Solving using a common final exam question. Here is the report of the results.   1. 79% of the students demonstrated knowledge of the formula for the force of a spring.      1. 70% of the students correctly calculated the proportionality constant. k = 3 using inches, k = 200 using feet      1. 82% of the students demonstrated understanding to convert from inches to feet (or vice versa). 2. 33% of the students used appropriate upper and lower limits of integration using feet   Or using inches     1. 81% of the students found the correct antiderivative. 2. 29% of the students found the correct numerical answer        1. 52% of the students used the correct units in the answer 2. 82% of the students used correct mathematical notation and presentation throughout their work. 3. 30% of the students wrote the correct integral, either |
| 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  Completed  No longer applicable | Strong mentoring was provided to the new adjuncts that were hired during the 2012 - 2013 academic year, and during the summer of 2013. Classroom visits were made and constructive feedback provided to ensure success of both adjunct faculty and students. All adjuncts were invited to participate in pedagogical discussions during Faculty Learning Days in 2012.  All adjunct faculty who teach PHY 220X are provided with a common syllabus that they are asked to adhere to. Faculty make some minor changes to suit their personal styles and pace but overall the topics that are covered and other general policies are the same across all sections of these courses. The same is true for the PHY 1106 course as well.  See above for details regarding the adjunct training session that was held on 1/17/2015.  We held another professional development session on Sept. 11, 2015 and the focus was on the lab program, particularly the PHY 220X lab program. This was attended by full time faculty, adjuncts, the Physics resource Lab coordinator and the tutors who work in the PRL. We believe this was very useful for both the adjunct faculty and the tutors. Adjunct faculty became more aware of the intent behind the way the labs are structured and the tutors became more familiar with the same and the process skills that need to be emphasized while students make up labs in the PRL due to absences.  New adjunct faculty are being mentored by our full time faculty. Course syllabi, labs and methods of engagement are shared with them. Classroom visitations are also part of the mentoring process.  An Adjunct Faculty handbook outlining the policies and procedures followed by the department has been developed. This handbook will be printed and disseminated to adjunct faculty starting summer 2016. |
| 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  Completed  No longer applicable | Greater alignment of the curriculum and mode of instruction has been achieved in the PHY 220X sequence and the PHY 1106/1107 course across all sections. The Astronomy courses have been aligned even before semester conversions. We anticipate alignment to occur in the PHY 114X sequence during the current academic year.  The laboratory program for PHY 220X courses has been revised and standardized across all sections. The revision process is still ongoing and this effort will continue through summer 2015. The laboratory program for PHY 1100 and PHY 1106 have also been standardized and lab manuals are in place and students purchase these for use in the courses.  Standardization of labs and curricular material has happened for all but the PHY 114X sequence. We have just commenced discussions regarding this sequence. We hope to make progress in this effort during Summer and Fall 2016. |
| 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  Completed  No longer applicable | We are in the process of forming an Advisory Committee. Invitations have been extended to the chairs of the Physics Departments at WSU and UD, WSU Engineering Dept., and SCC Allied Health. We are considering an industry partner and perhaps a high school administrator.  This effort was put hold for some time while preliminary work on formulating the physics degree program was underway. Both efforts are expected to be completed by mid-Fall 2015.  As part of reactivating the physics program, we formed an advisory board. Faculty from Wright State University, University of Dayton and SCC were recruited to serve on the board. In addition, members from industry and Dayton Public schools were invited. The first meeting was held on Nov. 1, 2015. The members of the advisory board provided us feedback on the operations of the department as well as the new program of study which will be incorporated once the program goes live in Fall 2016. |
| 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  Completed  No longer applicable | The department developed a survey to gauge the use and effectiveness of the PRL and this survey was administered to students during the 2012 - 2013 academic year. During Fall and Winter semesters students who used the PRL were very satisfied with the quality of help they received. We are in the process of hiring a new coordinator for the PRL and once the position is filled, we expect to enlist his/her help to correlate the usage data to success rates.  The Physics Resource Laboratory (PRL) in Room 4241, is a valuable student resource facility where students can receive tutorial assistance, make up laboratory work, use as a study center, and have access to other equipment and educational tools. The PRL is managed by a PRL coordinator and staffed by trained tutors. Historically, the number of students using the PRL has followed general enrollment trends. However, in the Spring 15 term, we are experiencing nearly a doubling of past usage when normalized to enrollment numbers. Specifically, by Spring break the PRL had approximately 640 visitors, whereas the total for the past few terms has been in the 700-800 range.  A significant reason for this increase has been the quality and stability of the PRL tutors. The coordinator and the two tutors all have various degrees in physics and each have multiple term experiences in the PRL. Frequent PRL staff changes in the past may have exposed students to a constant changing environment which the students may not have accepted as conducive to learning.  Calendar year 2015 proved to be great year for the Physics Resource Laboratory (PRL). For Spring, Summer, and Fall 2015, the number of student visits were 1,279, 494, and 1,356 respectively. For Spring 2016, the number of visits as of the date of this report is 623, which extrapolates to 1,424 for the term. Excluding the smaller summer term, this marks the third consecutive increase in visits since Fall 2014. These numbers also equal or surpass previous records when enrollment was higher. I attribute our success to the experience and long term stability of the PRL staff. We have two tutors with a B.S. in Physics and the coordinator who has a Ph.D. in Physics. |
| 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  Completed  No longer applicable | Since 2003, the department has gradually expanded its offerings of calculus-based physics (PHY 20X, PHY 220X) in an integrated lab/lecture format by co-scheduling lab and lecture sections in a back-to-back manner. This process started with one section taught by an adjunct, then all sections taught by tenure track faculty, and now all sections. We have expanded the offerings based on positive student feedback, and better coordination with part-time faculty made possible, in part, through easier sharing of curriculum materials using Angel. A similar “experiment” in our conceptual physics course (PHY 1000, PHY 1100, PHY 1106) has, in our opinion, been less successful, and we have contracted our efforts. An integrated lab/lecture format requires a greater time commitment per class meeting by students, and our audience for these classes (unlike the calculus-based cohort) does not generally see physics as a core requirement. Attendance problems, which tend to fragment lab groups and create the need for more make-up work, was one problem that arose with this cohort. The department felt that offering the course in smaller time blocks with a separate lecture and lab was a better fit for the students.  The PHY 220X, PHY 114X, and the face-to-face version of PHY 1100 are all offered in the integrated lab/lecture format with great success. As mentioned above, this modality of delivery of instruction was not very successful with PHY 1106 population and therefore, we have not pursued it this past academic year.  At this point in time, we do not see extending this modality to PHY 1106 for the reason stated above and therefore have not pursued it. |
| 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  Completed  No longer applicable | As mentioned before, we are in the process of formulating a plan to revive the associate degree program with a Physics emphasis. We expect the advisory committee to be a valuable resource and help provide some direction in this effort.  All the information has been gathered and a work flow process is in place to offer an associate degree program. Once the program outcomes have been determined and feedback received from the advisory committee mid-Fall 2015, the program details will be finalized and will be submitted via CMT by the end of the Fall, 2015 semester. The program is expected to go live in Fall 2017 after it goes through all the approval processes.  As stated above the program has been submitted in CMT and waiting approval. It is expected to go live in Fall 2016. |

**Section II: 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**.

**PLEASE NOTE – FOR THE PREVIOUS YEAR AND THIS YEAR, REPORTING OF GENERAL EDUCATION OUTCOME ASSESSMENT HAS BEEN TEMPORARILY POSTPONED. WE WOULD ASK THAT IN THIS ANNUAL UPDATE YOU IDENTIFY AT LEAST ONE COURSE IN YOUR DEGREE PROGRAM(S) WHERE ASSESSEMENT AT THE MASTERY LEVEL WILL OCCUR FOR THE FOLLOWING GENERAL EDUCATION OUTCOME:**

* **Cultural Diversity & Global Citizenship: Apply knowledge of cultural diversity to real world context by acknowledging, understanding, and engaging constructively within the contemporary world.**

**PLEASE RESPOND TO THE FOLLOWING QUESTIONS:**

**Do you have a required course in your program curriculum where Cultural Diversity & Global Citizenship could be assessed for mastery?**

**Yes No If yes, please list the course:** Click here to enter text.

**If no, is there an elective course that is listed on your Preferred Program Pathway Template where Cultural Diversity & Global Citizenship could be assessed for mastery?**

**Yes No If yes, please list the course:** Click here to enter text.

**If no, is there another elective course that is an option in your program curriculum where Cultural Diversity & Global Citizenship could be assessed for mastery?**

**Yes No If yes, please list the course:** Click here to enter text.

**If no, where do students master Cultural Diversity & Global Citizenship in your program? Do you need assistance incorporating this General Education outcome into your degree program?**

Click here to enter text.

**NOTE THAT THERE WILL NEED TO BE AT LEAST ONE EXAM / ASSIGNMENT / ACTIVITY IN THIS COURSE THAT CAN BE USED TO ASSESS MASTERY OF THE COMPETENCY.**

**YOU MAY ALSO SUBMIT ASSESSMENT RESULTS FOR THIS GENERAL EDUCATION COMPETENCY IF YOU HAVE THEM, BUT IT WILL BE CONSIDERED OPTIONAL**.

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| **Program Outcomes** | To which course(s) is this program outcome related? | Year assessed or to be assessed. | Assessment Methods  Used | What were the assessment results?  (Please provide brief summary data) |
| UNDER DEVELOPMENT  (Have these been developed? If so, please let us know and we can add them to the form) |  | N/A | N/A | N/A |
| Knowledge of Physics Principles | PHY 1100, PHY1141,PHY 1142, PHY 2201, PHY 2202 | 2017 | To be developed | N/A |
| Application of Physics Principles | PHY 1100, PHY1141,PHY 1142, MAT 2270, MAT 2280, PHY 2201, PHY 2202, | 2017 | To be developed | N/A |
| Scientific Enquiry | PHY 1100, PHY1141,PHY 1142, CHE 1211, CHE 1251, PHY 2201, PHY 2202, | 2017 | To be developed | N/A |
| Scientific Writing and Communication | PHY 1161, PHY 2201, PHY 2202 | 2017 | To be developed | N/A |
| Research/Team Work | PHY 1100, PHY1141,PHY 1142, PHY 2201, PHY 2202, | 2017 | To be developed | N/A |

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| **Are changes planned as a result of the assessment of program outcomes? If so, what are those changes?** | N/A |
| **How will you determine whether those changes had an impact?** | N/A |