**Sinclair Community College**

**Continuous Improvement Annual Update 2013-14**

**Please submit to your dean and the Provost’s Office no later than Oct. 1, 2013**

**Department:** 0355 – Chemistry 0357 Geology

Year of Last Program Review: FY 2012-2013

Year of Next Program Review: FY 2017-2018

**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?*

There are very few employment opportunities open to individuals who complete only a two-year program in either Chemistry or Geology. Hence, most, if not all, of the students attending SCC who are interested in pursuing a degree in either of these areas take the offered courses with the sole expectation that these credits will transfer to their college or university of choice. The courses we offer are accepted most anywhere the student chooses to go so few students consider a two-year degree essential to their goals. That being said, both the department and the college need to do a better job of promoting the two-year degree as a step toward the four-year degree, giving the student something more tangible than mere completion of courses.

**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.

The following table summarizes the data from Appendix A. In all cases, the first quarter of the three-quarter sequence was equated with the first semester. Likewise, the third quarter was equated with the second semester. This was done because most of the relative semester content was from the individual quarter. Where data were available from a quarter and semester in the same year, the data were averaged.

Course FY 07-08 FY 08-09 FY 09-10 FY 10-11 FY 11-12 FY 12-13

CHE 120/1111 67.2% 66.5% 63.1% 60.3% 66.6% 66.7%

CHE 122/1121 93.6% 87.3% 83.7% 80.1% 79.2% 79.8%

CHE 151/1211 75.8% 70.1% 74.4% 63.8% 70.7% 70.9%

CHE 153/1221 88.5% 86.0% 89.4% 87.3% 85.0% 85.7%

CHE 141/1311 76.5% 75.0% 72.0% 66.1% 62.0% 62.7%

CHE 143/1321 92.3% 100.0% 88.9% 90.0% 83.3% 91.7%

CHE 201/2111 82.4% 86.4% 81.1% 75.6% 88.1% 85.8%

CHE 203/2121 88.2% 93.5% 94.0% 88.3% 87.5% 94.1%

GLG 141/1101 82.0% 76.0% 84.2% 81.4% 79.6% 83.5%

GLG 142/1201 91.1% 91.9% 91.0% 92.7% 92.4% 87.9%

With the exception of CHE 122/1121, there was no clear trend observed during the review period. The fluctuations observed for some of the courses is due to the small sample size - few students in each course. It is uncertain what is contributing to the trend observed for CHE 122/1121. Since the data before FY 07-08 is not present, it is not clear if that one year is an anomaly; the remaining years are statistically similar. It is not due to a change in instructors or the content provided in the course. If there is a trend, there are two possible explanations. (1) More students who have completed a high school course are skipping the first semester, thinking that they have acquired the necessary skills to succeed in the second semester. Most high school curricula do not include organic chemistry among the topics discussed, something that is included in the first semester of SCC's Intro Chem course. As a result, they are unprepared to handle the organic and biochemistry topics that are paramount to the second semester. (2) More students, especially those interested in pursuing a nursing degree, are recognizing the need to have both semesters of the Intro Chem course. There is a strong push by those hiring nurses to expect a four-year BSN degree instead of a two-year RN degree. Most four-year nursing schools require a full year of chemistry. Some of the students entering the second semester were marginal students in the first semester and have not acquired the necessary understanding of the topics covered in the first semester to succeed in the second semester.

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.)

This request does not particularly apply to either facet of our department as we have no accreditation issues and most students, for the reasons described earlier, do not pursue an associate degree in chemistry or geology. However, there is good reason for students to acquire a two-year degree, even though they intend to complete a four-year degree. Employers appreciate evidence of program completion, so, though few companies have positions that require only a two-year degree, it makes the student more employable, possibly providing income while continuing his/her education. It is one of our goals to facilitate and encourage degree completion.

Many of the students who take the first semester of any of the first-year chemistry courses are not required to take the second semester, so it is difficult to track course sequence completion. And, since, as described above, most companies do not hire two-year chemistry or geology graduates, we have not tracked placement of graduates. We have only anecdotal data from students who have completed work here and have moved on to other institutions or have graduated from the desired four-year program. In all cases, they report feeling well-prepared by the coursework pursued at SCC.

We are in the early stages of adding national exams to the chemistry program. Restrictions when applying current exams make it difficult to apply to our program, but previous exams, or questions derived from those exams should serve to validate student success. An exam, similar to those applied nationally, has been given to one section of General Chemistry; the average grade was equivalent to the national average for that exam. We expect to administer a similar exam each year to all sections of General Chemistry are are looking into acquiring a similar exam for Organic Chemistry. There is no national exam for Introductory nor College Chemistry, but we have created a set of questions from which a comprehensive exam is created to be given to each section. This will help us track student success and address areas that need improvement.

There is no national exam for Geology students at the level taught by our department.

**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** |
| It is the collective goal of the department to have all students successfully complete the courses in which they enroll. Faculty in the department have open-door policies for students who need additional help. | In progress  Completed  No longer applicable | We continue to have an open-door policy to help any student who seeks it. |
| While Geology has very little attrition, most of which is related to financial issues rather than academic, Chemistry, because of its more mathematical and conceptual character, loses a sizeable percentage of students during the semester. This is often due to students enrolling in the course without the needed skill set or background. Better advising and better control of student enrollment can improve this to some degree, but Chemistry also needs to look for other methods of instruction to meet the students’ needs. This is being addressed in part by redesigning the Introductory Chemistry course to include more interactive activities between small groups of students and tutors employed by the department. | In progress  Completed  No longer applicable | A pilot program in which small groups of students interact on-line was implemented with limited success during the spring and summer semesters of 2013. Issues which interfered with the success of the program were addressed and an additional pilot program implemented during the fall 2013 semester. The principal challenges to using this redesigned group study are finding capable tutors and dealing with internet issues. The desire is to be able to make this available to all students, but is limited by the availability of qualified tutors. More funding may be needed to implement this program, once its success has been determined, on a wider scale. |

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.

|  |  |  |
| --- | --- | --- |
| **RECOMMENDATIONS** | **Status** | **Progress or Rationale for No Longer Applicable** |
| Repairs that are needed to Chemistry labs were mentioned during the meeting with the review team. The team was particularly concerned about ventilation repairs that were reported as being needed. Given the department’s commitment to safety, there is no doubt that the department is interested in seeking repairs as soon as possible, and while it may be too late to address these repair needs in the Capital Request process for this year, other sources of funding for these repairs should be explored with the division dean. | In progress  Completed  No longer applicable | We will be contacting Facilities Management to pursue these issues. Plans are being made to include upgrading the laboratory rooms in the Capital Requests for the coming year. |
| During the meeting with the review team the department noted that students struggled due to inadequate math skills in introductory Chemistry courses. The department has done a nice job of identifying the problem, although in the subsequent discussion it was not clear whether there is certainty regarding exactly what is causing the problem. As noted in the commendations, the department has demonstrated skill in the past in using data to solve problems and make decisions, and the review team recommends that the department employ this skill to attempt to resolve this issue. The department is encouraged to explore ways to help students develop the math skills they need to succeed in Chemistry courses, and assess the impact of any measures they implement. There may be opportunities to employ online resources to bolster math skills, perhaps a collaborative effort with the math department could lead to the development of approaches that would help Chemistry students achieve higher levels of success by improving math skills. | In progress  Completed  No longer applicable | Plans are being made to interact with the Developmental Math group to determine what we can collectively do. |
| The Geology component of the department lacks visibility, and there is some indication that this may have impacted enrollment. The chair indicated that increasing visibility for Geology has been a concern since he took over leadership of the department, and it is recommended that the department move forward with efforts to once again incorporate Geology into the department name and prioritize other appropriate efforts to increase the visibility of the Geology segment of the department. | In progress  Completed  No longer applicable | We worked with the web design team to place Geology as a separate program so that it is immediately visible with all the Sinclair programs. |
| It was noted that the program outcomes that the department is using are the ones that were used when Chemistry was merely an emphasis area under Liberal Arts and Sciences. Now that Chemistry is being treated as a stand-alone degree program, it would be appropriate to develop some program outcomes that are targeted for Chemistry. The existing outcomes may be kept if that is the department’s wish, but they should be supplemented by outcomes that distinguish Chemistry from other degree programs. It is recommended that the department work with the division learning liaison to develop effective and measurable outcomes. | In progress  Completed  No longer applicable | This will be addressed in the coming year during deparmental meetings. |
| The recommendations from the previous Program Review were not addressed in the current self-study – the department should prioritize work on these recommendations from the last Program Review, as summarized below:  **Recommendations for Action**:   * Develop evidence of student learning outcomes attainment and share the analyses with associated LHS departments to identify improvement targets * Enlist the support of RAR to investigate the promise of prerequisites in courses where student success is compromised due to perceptions of inadequate academic background **(in progress)** * Validate the department’s assertion there is a difference in student performance based on instruction by full-time versus part-time faculty through an RAR-supported study * Conduct a needs analysis to identify part-time faculty development opportunities; deliver workshops and other training as appropriate * Evaluate and pilot alternative modes of lecture/lab delivery through hybrid course formats and distance learning opportunities (off campus locations, too) as new models emerge   o Benchmark other institutions and other departments on campus  o Work with Distance Learning to identify current examples  o Track students who transfer to obtain systematic feedback for the department’s use in refining curriculum and instruction | In progress  Completed  No longer applicable | Bullet points 1, 3, and 5 have been referenced in previous updates and in the last Program Review. We need to enlist the help of the Research Analytics & Reporting group to address the second bullet point. One of the challenges faced by the department is the development of adjunct faculty. Many of the newer adjunct faculty, however, have full-time jobs elsewhere, so finding the time for them to attend workshops and other training is a challenge. We continue to monitor their work and offer suggestions and intervention where needed and appropriate. |
| Work with the Academic Staffing Coordinator to identify and implement a sustainable strategy to recruit part-time faculty members | In progress  Completed  No longer applicable | This is a major issue for both Chemistry and Geology. It is quite difficult to find qualified instructors, both with knowledge and teaching skill, in both of these areas who are available at the times needed. Numerous advertisements have been placed in the local papers with limited results, particularly in the Dayton area. We will continue to pursue all leads to create a list of potential adjunct instructors. |
| As experienced faculty members consider retirement, it is recommended that the department develop formal approaches for documenting their knowledge so that as much as possible is preserved before these faculty members transition out of the department. | In progress  Completed  No longer applicable | We are implementing a process to create documents for each semester of each course that lays out the minimum and maximum lists of concepts to be completed by the end of the term. Included with this list will be possible demonstrations and other suggestions for concept presentation. These documents will be made available to each instructor to guide their individual classroom preparation. It is also designed to minimize the instructional variability between sections yet allow for some variation in emphasis based on the individual instructor's interests. |
| The Program Review is an opportunity to highlight department successes, innovations, and strengths – it was the sense of the review team that there are a number of impressive things the department is doing and a number of faculty achievements that were not communicated in the self-study. The department should utilize the Program Review and Annual Update processes to spotlight its strengths. Prior to future Annual Update and Program Review submissions, the department should engage in some deep reflection regarding successes that should be shared. The review team also felt that there could have been more reflection regarding opportunities for improvement in the department. While some challenges were mentioned, often solutions were not proposed or discussed in the self-study. The review team requests that the department conduct a more extensive Strengths/Weaknesses/Opportunities/Threats analysis and share it with the Provost’s Office within the next three months to ensure that the department is able to benefit from the self-assessment and thoughtful reflection that are one of the major benefits of the Program Review process and that should guide the development of the self-study. The self-study document isn’t really the end product of Program Review – the opportunity for departmental self-reflection and improvement is really what the process is designed to produce. | In progress  Completed  No longer applicable | This will be discussed duing our several departmental meetings in the coming year. |

**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 Methods  Used | What were the assessment results?  (Please provide brief summary data) |
| Critical Thinking/Problem Solving | | All programs | **2012-2013** | Many of the questions included in the regular in-class examinations require critical-thinking and problem-techniques to correctly answer them. | Our students continue to be challenged in this area. This demands additional efforts on our part with help from other departments, particularly the Math department. |
| Values/Citizenship/Community | | All programs | **2013-2014** |  |  |
| Computer Literacy | | All programs | **2014-2015** |  |  |
| Information Literacy | | All programs | **2015-2016** |  |  |
| Oral Communication | | All programs | **2016-2017** |  |  |
| Written Communication | | All programs | **2016-2017** |  |  |
|  | |  |  |  |  |
| **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) |
| Achieve group goals in a variety of social contexts. | | SCC-1101 |  |  |  |
| Communicate effectively in a variety of ways with varied audiences through writing skills, oral communication skills, listening skills, reading skills, computer literacy and information literacy. | | COM-2211 COM-2225 ENG-1101 ENG-1201 |  |  |  |
| Demonstrate ability to think logically and solve problems using analysis, synthesis and evaluation. | | CHE-1211 CHE-1221 CHE-2111 CHE-2121 MAT-2270 MAT-2280 MAT-2290 |  | Many of the questions included in the regular in-class examinations require critical-thinking and problem-techniques to correctly answer them. | Our students continue to be challenged in this area. This demands additional efforts on our part with help from other departments, particularly the Math department. |
| Demonstrate responsibility and accountability in accomplishing goals. | | SCC-1101 |  |  |  |
| Recognize and articulate an understanding of the increasing interdependence of world cultures and their consequences. | |  |  |  |  |

**General Education Outcomes**

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

No changes are planned.

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

N/A

**Program Outcomes**

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

No changes are planned.

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

N/A

**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?

We continue to look for ways to encourage our students to put forth the needed effort for success and ways to convey the concepts in ways the students can comprehend. In the meantime, we will enlist the aid of the Research Analytics and Reporting group to help us determine areas in which we should improve.

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

No

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

**Degree and Certificate Completion**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Division | Department | Department Name | Program | FY 07-08 | FY 08-09 | FY 09-10 | FY 10-11 | FY 11-12 | FY 12-13 |
| SME | 0355 | Chemistry | CHEE.AS | 2 | 3 | 9 | 1 | . | 3 |
| SME | 0357 | Geology | GLGE.AS | . | 1 | . | . | . | 1 |

**Course Success Rates**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Department** | **Department Name** | **Course** | **FY 07-08** | **FY 08-09** | **FY 09-10** | **FY 10-11** | **FY 11-12** | **FY 12-13** |
| 0355 | Chemistry | CHE-1111 | . | . | . | . | . | 61.9% |
| 0355 | Chemistry | CHE-1121 | . | . | . | . | . | 77.0% |
| 0355 | Chemistry | CHE-1151 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-1161 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-120 | 67.2% | 66.5% | 63.1% | 60.3% | 66.6% | 71.4% |
| 0355 | Chemistry | CHE-121 | 83.3% | 88.0% | 85.7% | 83.3% | 78.2% | 71.4% |
| 0355 | Chemistry | CHE-1211 | . | . | . | . | . | 70.9% |
| 0355 | Chemistry | CHE-122 | 93.6% | 87.3% | 83.7% | 80.1% | 79.2% | 82.6% |
| 0355 | Chemistry | CHE-1221 | . | . | . | . | . | 81.0% |
| 0355 | Chemistry | CHE-1251 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-126 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-1261 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-127 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-128 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-1311 | . | . | . | . | . | 62.7% |
| 0355 | Chemistry | CHE-1321 | . | . | . | . | . | 91.7% |
| 0355 | Chemistry | CHE-1351 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-141 | 76.5% | 75.0% | 72.0% | 66.1% | 62.0% | . |
| 0355 | Chemistry | CHE-142 | 86.7% | 93.3% | 92.9% | 92.3% | 91.7% | . |
| 0355 | Chemistry | CHE-143 | 92.3% | 100.0% | 88.9% | 90.0% | 83.3% | . |
| 0355 | Chemistry | CHE-147 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-148 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-149 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-151 | 75.8% | 70.1% | 74.4% | 63.8% | 70.7% | . |
| 0355 | Chemistry | CHE-152 | 74.5% | 76.6% | 79.3% | 77.5% | 79.0% | . |
| 0355 | Chemistry | CHE-153 | 88.5% | 86.0% | 89.4% | 87.3% | 85.0% | 90.3% |
| 0355 | Chemistry | CHE-157 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-158 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-159 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-201 | 82.4% | 86.4% | 81.1% | 75.6% | 88.1% | 93.8% |
| 0355 | Chemistry | CHE-202 | 86.8% | 91.9% | 84.3% | 84.2% | 90.0% | 93.8% |
| 0355 | Chemistry | CHE-203 | 88.2% | 93.5% | 94.0% | 88.3% | 87.5% | 95.7% |
| 0355 | Chemistry | CHE-207 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-208 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-209 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-2111 | . | . | . | . | . | 77.5% |
| 0355 | Chemistry | CHE-2121 | . | . | . | . | . | 92.5% |
| 0355 | Chemistry | CHE-2151 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-2161 | . | . | . | . | . | . |
| 0355 | Chemistry | CHE-245 | . | 100.0% | . | . | . | . |
| 0355 | Chemistry | CHE-270 | 100.0% | 100.0% | . | . | 100.0% | 100.0% |
| 0355 | Chemistry | CHE-297 | . | . | 100.0% | . | . | . |
| 0357 | Geology | GLG-1101 | . | . | . | . | . | 83.5% |
| 0357 | Geology | GLG-1111 | . | . | . | . | . | . |
| 0357 | Geology | GLG-1201 | . | . | . | . | . | 87.8% |
| 0357 | Geology | GLG-1211 | . | . | . | . | . | . |
| 0357 | Geology | GLG-1301 | . | . | . | . | . | 100.0% |
| 0357 | Geology | GLG-141 | 82.0% | 76.0% | 84.2% | 81.4% | 79.6% | . |
| 0357 | Geology | GLG-142 | 86.4% | 85.1% | 84.7% | 84.8% | 81.4% | 54.5% |
| 0357 | Geology | GLG-143 | 91.1% | 91.9% | 91.0% | 92.7% | 92.4% | 88.0% |
| 0357 | Geology | GLG-144 | 90.9% | 88.9% | 100.0% | 100.0% | . | . |
| 0357 | Geology | GLG-147 | . | . | . | . | . | . |
| 0357 | Geology | GLG-148 | . | . | . | . | . | . |
| 0357 | Geology | GLG-149 | . | . | . | . | . | . |
| 0357 | Geology | GLG-297 | 83.3% | . | . | . | . | . |