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COMPLETE

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Page 1: I. Program Reflection and Description

**Q1** Department(s) Reviewed:

Chemistry

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**Q2** Lead Author and Collaborators:

Robert Anness

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**Q3** Dean:

Pam Kersey

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**Q4** Provide a list of the recommendations from your last program review and explain how you have addressed them. Previous years' program reviews can be found here, on the IPRPC Intranet site.

After scanning through all of the program review reports that were archived (including annual updates), only a couple of recommendations were provided on the IPRPC committee feedback forms. One was from the Instructional Program Review and Planning for 2014-2105 report where the committee recommended that the chemistry department continue to move forward with our planning and SLO assessment processes. An updated discussion of our SLO assessment in chemistry is provided in Section III of this report.

On the IPRPC committee feedback form for the most recent annual update (Planning for 2018-2019) there was a mention that a specific question was not answered. The question was:

“Are there any specific groups that have success rates lower than the overall success rate for the program? What steps will the program take to improve the success of these student groups?”

While there was an answer provided to this question, it focused on the lower success rates among students in our two entry level chemistry courses (Chem 102 and Chem 120) and how the program was addressing this issue. The committee was likely hoping to see success rate analysis disaggregated by demographics such as gender and ethnicity. Success rates for specific groups are analyzed in detail in Section IV of this report, along with steps being taken to promote improvement.

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## Instructional Comprehensive Program Review

**Q5** Provide a list of tenured/tenure track faculty and support staff in the program as of fall 2016.

Laurie LeBlanc-Tenured Faculty

Robert Anness-Tenured Faculty

Robert Dutnall-Tenure Track Faculty

Violeta Casillas-Classified Staff (Senior Lab Technician)

Elizabeth Hill-Classified Staff (Lab Technician)

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**Q6** Provide your program's mission statement.

The mission of the Chemistry Program is to provide excellent instruction, support and guidance to science and nonscience majors using a variety of methodologies that are innovative, to promote student learning and engagement, to prepare students for transfer to four-year institutions, for work in the allied health careers, and for employment in related fields.

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**Q7** Describe how your program supports the mission and goals of the College.

The Chemistry Discipline at Cuyamaca College is continuing work to develop and enhance existing parts of a comprehensive network of student support for STEM students. This work is being carried out jointly with other STEM disciplines such as biology, physics, and engineering with the goal of providing significant assistance to disproportionately impacted students. Since this work began in the 2014-2015 academic year it has been bolstered by multiple financial awards, such as \$5000 from Student Equity funds and dual awards of \$10,000 each to support an (1) Allied Health cohort and (2) disproportionately impacted STEM students. In October 2016, LeBlanc & Nette were awarded a Department of Education Title III HSI-STEM grant entitled STEM Guided Pathways and Transformational Teaching Practices, which has an annual budget of \$1.2 million for a 5-year period. This grant project addresses key challenges as well as opportunities for innovation and improvement. There is a focus on building and supporting a STEM Guided Pathway in the Science & Engineering Department, the creation and development of programs and interventions intended to become sustainable, the development of curriculum in the sciences that will serve to increase retention and success, and enhanced collaboration with partners on campus while creating additional STEM transfer degrees. Student support structures offered via the grant project include faculty mentorship and 2-week STEM Summer Boot Camp for STEM cohort students, dedicated STEM academic advising, science games in the STEM Center (e.g. Periodic Table bingo, chemistry relay team game, chemistry card game & biology jeopardy), quiet study areas, a science & engineering tutoring area, study skills workshops and course-specific workshops for students in our entry-level chemistry and biology classes. We also continue to host a variety of panel discussions, presentations and events related to STEM careers and summer research opportunities for students.

Faculty training related to the grant goals has included reading apprenticeship philosophy and techniques, active learning techniques in science, and faculty mentorship training. Room F-606 has been converted into an active learning classroom to facilitate the use of these modern teaching methods.

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**Q8** Provide the description of your program as it appears in the current college catalog, available here.

The chemistry curriculum is designed to provide students who choose to work toward a bachelor's degree a well-balanced, lower division program with a strong emphasis on fundamentals and problem solving. This major fulfills the lower division requirements (except for analytical chemistry) for chemistry majors and is typical of the requirements at four-year colleges and universities.

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## Instructional Comprehensive Program Review

### Q9 Degree/Certificate #1

Associate in Science Degree in Chemistry

Four A.S. degrees in Chemistry were awarded during the past five years. The data was last reviewed and updated after the 2017-2018 academic year. The courses that comprise this degree fulfill the lower division requirements (with the exception of analytical chemistry) for chemistry majors and is typical of the requirements at four-year colleges and universities. The degree requirements can be completed within a two-year period.

### Q10 Degree/Certificate #2

Respondent skipped this question

### Q11 Degree/Certificate #3

Respondent skipped this question

### Q12 Degree/Certificate #4

Respondent skipped this question

**Q13** Please upload the awards data tables for your program. You can print that worksheet from the program review data report to PDF or copy and paste into a Word document the awards data table rows for your program from the college-wide program review data report, accessible here.

**Chemistry Awards Table F13-Sp18.docx (12.5KB)**

Page 3: III. Curriculum Review, Development and Assessment

**Q14** Access the Five Year Curriculum Review Cycle. **Yes**  
Have all of your active course outlines been reviewed within the last five years?

**Q15** Write a paragraph about any changes planned for the curriculum, both areas of revision and areas of development and growth.

Most of the changes to our chemistry course outlines in recent years have been limited to updating course materials and modifying course SLOs. While we don't have any major overhauls planned for any of our course curricula, we are hoping that the new SLOs will allow for better assessment so we can more quickly improve upon the presentation and delivery of course material to the students. We also have a general focus on incorporating more project-based and active learning components in all of our classes. Some examples of student projects are poster presentations and research papers based on chemistry journal articles.

One class that we hope to add in the future is an analytical chemistry class. SDSU has not been able to handle the demand for their analytical chemistry class and so they have recently started requiring pre-transfer community college students who need it to take it prior to transfer. Unfortunately, there are very few community colleges in the area that offer this class. With the expansion of the H-building made possible via HSI STEM funding, we are projected to have a new chemistry lab available for our entry-level courses (Chem 102 and Chem 120) up and running by the Spring 2020 semester. This would free up space in our existing labs that could potentially be used to run an analytical chemistry class.

## Instructional Comprehensive Program Review

**Q16** Do you have an assessment plan on file with SLOAC? If you have not already done so, you can submit your program's assessment plan to SLO Coordinator, Tania Jabour, at [tania.jabour@gcccd.edu](mailto:tania.jabour@gcccd.edu). **Yes**

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**Q17** Following that assessment plan, is your program's data up-to-date and complete in Nuventive/TracDat (including methods of assessment, results, dialogue/actions and follow-up)? If you are not sure, please contact Institutional Effectiveness Specialist, Erich Kevari, at [erich.kevari@gcccd.edu](mailto:erich.kevari@gcccd.edu) to submit your assessment data. **Yes**

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**Q18** What student learning-related successes and challenges have SLO results revealed for your department? Note: If SLO data are not offering useful feedback regarding student learning, and are not currently informing program improvements, please instead discuss the specific steps you plan to take to make learning outcomes and assessments more meaningful.

Over the last several years, the chemistry department has modified our course SLOs to streamline them and make them more meaningful. Moreover, prior to the Fall 2014 semester we devised a three-year plan in which all of the active course SLOs would be assessed over that time-period. The cycle repeats once each three-year period is up. We have stuck relatively faithfully to this plan since its inception, with some minor modifications along the way. Overall I think this process is a good way to keep us on track with our assessments, however some flexibility is important. For instance, we may want to assess a particular course SLO more frequently, especially if we've made changes in the classroom to improve upon prior results. One example of a success story resulted from SLO assessment in our Chemistry 102 class. Chem 102 is an accelerated course which introduces our allied health students to general, organic and biochemistry in one semester. Significant improvement was observed with regard to a particular SLO that dealt with the students' ability to set up and solve dimensional analysis problems. Dimensional analysis is a core skill in chemistry, and one that incoming chemistry students typically find challenging. The SLO was assessed in the Fall 2014 semester with unsuccessful results. Only 51% of students were successful with this SLO based on an exam question used for assessment. To improve student success with this skill, a dimensional analysis practice worksheet was created by the Chem 102 coordinator and distributed to all instructors each semester. In conjunction with this, some laboratory time is now set aside for an active-learning, dimensional analysis workshop that allows students the opportunity to work through problems in the worksheet with the instructor present to answer questions and provide guidance. More generally, over the last few years we have been consistently offering workshops outside of class that are open to all Chem 102 students. In accordance with our three-year SLO assessment plan, this SLO was reassessed in the Fall 2017 semester using an exam question again as the assessment tool. This time around the success rate among students was 76%. We are very happy to see this level of improvement, and confident that some of the changes made in terms of introducing this material contributed to this positive result.

We've updated our SLO plan at our SLO meeting during Spring 2019 Professional Development week. The plan shows which SLOs (and PLOs) will be assessed each semester through Fall 2022. We made some changes from the previous plan to allow some SLOs to be assessed more often so we can more quickly see how the changes we make affect the results.

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**Q19** Do you have a PLO assessment plan on file with SLOAC? If you have not already done so, you can submit your program's assessment plan to SLO Coordinator, Tania Jabour, at [tania.jabour@gcccd.edu](mailto:tania.jabour@gcccd.edu). **Yes**

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## Instructional Comprehensive Program Review

**Q20** Please provide an analysis of your program learning outcomes (PLO) findings and what changes, if any were made as a result.

Until recently, assessment of the three PLOs for the chemistry program were unfortunately neglected. However, our full-time faculty had a chance to discuss the three chemistry PLOs and we began collecting data related to one of our PLOs for the first time during the Fall 2018 semester. We also made sure to include PLOs in our updated assessment plan. The specific PLO related to the Fall 2018 assessment is the following:

“Develop critical thinking skills by predicting interactions between different types of matter, both physical and chemical; analyzing matter in the laboratory both qualitatively and quantitatively; performing mathematical calculations related to the transformation and analysis of matter; and solving qualitative and quantitative problems in connection with the transformation and analysis of matter.”

The assessment tool used for this PLO was a laboratory practical exam given to students in our Chemistry 120 class. The practical evaluates the students' ability to employ various laboratory techniques learned in the class to carry out a number of different experimental tasks, and then analyze the results. Due to historically lower scores on this exam we started offering lab practical workshops to our students prior to the exam so they could get more practice. These workshops have been offered for three semesters now and we have been seeing significantly increased lab practical exam scores since their implementation. The specific results of the PLO assessment from Fall 2018 are currently being analyzed the results are forthcoming.

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**Q21** Is this a CTE Program?

**No**

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### Page 4: CTE Programs Only

**Q22** If a CTE program, provide a list of the committee members of your Advisory Committee, the chair's name, and the meeting schedule (e.g., twice yearly)

**Respondent skipped this question**

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**Q23** Summarize the recommendations from the Committee.

**Respondent skipped this question**

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**Q24** Describe changes that have been made to the program as a result of the committee's recommendations

**Respondent skipped this question**

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**Q25** If a CTE program, please discuss your labor market information. You can access labor market information on the CTE Launchboard, CTE Program Reports that have been prepared for the Governing Board, or by contacting the IESE Office at [brianna.hays@gcccd.edu](mailto:brianna.hays@gcccd.edu).

**Respondent skipped this question**

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### Page 5: IV. Program Data Analysis

## Instructional Comprehensive Program Review

**Q26** How has the program's student population changed over the past 5 years (e.g., student demographics, enrollment, etc.)? Note that you can access your program's data report and the college-wide data report here.

Student demographics:

With regard to student demographics in our chemistry courses, there does not appear to be any significant change over the past five years. The gender distribution has held steady with an average of 55% female students versus 44% male students with very little fluctuation from semester to semester (see Chart 1). The two largest ethnic groups represented in our chemistry classes over the past five years are white students (averaging 46%) and Hispanic students (averaging 33%). The next largest group are students representing multiple races/ethnicities (7%), followed by Asian and Filipino students (both at 5%), and then African-American students (3%). While there is some small fluctuation from the average in each of these groups from semester to semester, there doesn't seem to be any observable trends indicating an increase or decrease in any of these student populations (see Chart 2). Instead the data shows a random scattering around the average over this time-period.

Enrollment:

For the most part we've seen an increase in enrollment over the past five years as we've added sections to accommodate large waitlists. However, the data indicates that enrollment may be reaching a plateau as we've maxed out the amount of sections that our facilities, equipment and support staff can handle (see Chart 3).

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**Q27** How does the program's student population differ from the College's overall student population, if at all? Note that you can access your program's data report and the college-wide data report here.

The gender distribution in the chemistry program matches closely with that of the College as a whole. The percentage of female students in our chemistry classes is 55%, versus 54% college-wide. The percentage of male students in chemistry is 44%, versus 45% at the College. The two largest ethnic groups College-wide also track very closely with the distribution in chemistry. White, non-Hispanic students make up the largest group at 46% in chemistry with the same percentage college-wide. Hispanic students represent 33% of chemistry students and 32% at the College. It should be noted that the category of White, non-Hispanic includes a large percentage of Middle-Eastern students that are not specifically indicated from the data provided by the College. This has been made clear via independent surveys solicited by the Science/Engineering department in past semesters. It will be important to disaggregate this data in the future to better understand the composition of our student population in order to best meet their needs.

There is some variation between the chemistry program and the college regarding the next most prominent groups. Chemistry has a larger percentage of Asian and Filipino (5% in both categories) students than the college as a whole (3% in both categories). However, with regard to African-American students chemistry has a smaller percentage (3%) than the college (6%).

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**Q28** What are the implications for ensuring the program is addressing the needs of its student population?

With such a diverse student population it is imperative that the program finds ways to engage our students and get them on the right track as quickly as possible. The activities related to our HSI-STEM grant are geared toward these goals. Activities associated with these goals are mentioned throughout this report and include faculty mentorship, in-house STEM counseling, study skills workshops, entry-level course (Chem 102 and Chem 120) support workshops, chemistry tutoring, events and presentations related to STEM career and research opportunities.

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**Q29** If you would like to attach any charts or additional documentation (aside from the program review report prepared by the IESE Office), please upload it using the button below.

**Charts for Chemistry Comprehensive Program Review.docx (37.9KB)**

## Instructional Comprehensive Program Review

### **Q30** How has the program's success rate across all courses changed over the past 5 years?

The success rate across all chemistry courses over the past five years has averaged 63%. As shown in the Chart 4, there is fluctuation around the average in any given semester but no clear trend.

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**Q31** The College has set a 2024 goal of reaching a 77% course success rate (students passing with a grade of A, B, C, or P out of those enrolled at census) for the College as a whole. Consider how your will program help the College reach its long-term goal of increasing the course success rate to 77%. Your program may have a program-specific goal for program-wide success rate that differs from the college goal, based on historical or contextual data/information. This is intended to provide a goal for improvement only; programs will not be penalized for not meeting the goal. What is your program's one-year (2019/20) goal for success rate across all courses in the program?

Many of our chemistry classes have success rates that are higher than 77%. However, our overall success rate across all courses is only 63% as mentioned above. The average is largely dragged down by lower success rates in our entry-level chemistry courses (Chem 102 and Chem 120), of which we offer the most sections compared to any of the other courses. While it is difficult to come up with an exact success rate goal for the next academic year, we will continue to implement interventions and support services geared to students in these introductory courses. Currently we offer pre-semester Gear Up For Success workshops for Chem 102, Chem 120, and Chem 141, which are our three lowest level chemistry courses. The Gear Up workshops for the entry-level courses focus on study skills and math skills that will be important for these classes. Moreover, we offer dedicated workshops during the semester for both Chem 102 and Chem 120 that are available to all students in these classes, and typically occur twice a week.

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### **Q32** Which specific groups (by gender and ethnicity) have success rates lower than that of the program overall?

Both male and female chemistry students have tended to have success rates that are very close to the overall success rate in chemistry over the past five years as shown in the graph. However, female students tended to have success rates that were slightly higher than the average success rate in any given semester while male students tended to be slightly lower (see Chart 5).

To analyze chemistry success rates by ethnicity, a graph was created that looks at success rates of particular groups as a percent difference from the average rates (see Chart 6). Comparing our two largest groups first (White, Non-Hispanic and Hispanic), there is a clear difference in success rates. While white, non-Hispanic students had higher success rates than the overall rate (averaging 9% above average) during every semester over the past five years, Hispanic students had lower success rates each semester (averaging 15% below average). Other ethnic groups tended to fluctuate above or below the average success rate depending on the semester. This is most likely due to the fact that these groups represent a much smaller percentage of overall enrollment in chemistry, and so the sample sizes are pretty small. However, it should be noted that while the success rates for Asian and Filipino students tended to be above the average most semesters (averaging 7% above average for Asian students and 4% above average for Filipino students), African-American students had below average success rates in all but three semesters over the past five years (averaging 18% below average).

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### **Q33** What program (or institutional) factors may be contributing to these lower rates of success for these groups of students?

The lower success rates for Hispanic and African-American students (as compared to White, Non-Hispanic students) reflect national trends and point to the fact that these communities have been disproportionately impacted by multiple forms of discrimination and other factors. This means that students from these communities are more likely to be low-income, first-generation college students facing greater challenges in their personal lives, and with regard to navigating the college terrain. An equity-minded focus from the college and its individual programs is crucial to mitigating these hurdles for our students.

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## Instructional Comprehensive Program Review

**Q34** What specific steps will the program take to address these equity gaps in the 2019/20 academic year?

The HSI-STEM grant activities mentioned earlier in this report have been specifically designed to increase the retention and success of first-entering students, low-income students, first-generation college students and disproportionately impacted students. With the help of the Institute for Evidence-Based Change (IEBC) and the campus Institutional Effectiveness Division, we are collecting data to measure the effectiveness of our student support interventions.

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**Q35** How do these activities inform the long-term program goals that you are setting in this comprehensive program review?

We have recently received the first data report regarding the effectiveness of our student support activities, and evaluation of these initial results is in progress (See Section VI of this report for more details). Ongoing data reports will be used to shape our support interventions over the long-term to best increase success and retention among STEM students.

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**Q36** If you would like to attach any charts or additional documentation (aside from the program review report prepared by the IESE Office), please upload it using the button below.

**Respondent skipped this question**

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**Q37** Does your program offer any courses via distance education (online)?

**No**

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### Page 6: Distance Education Course Success

**Q38** Are there differences in success rates for distance education (online) versus in-person sections?

**Respondent skipped this question**

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**Q39** If there are differences in success rates for distance education (online) versus in-person classes, what will the program do to address these disparities?

**Respondent skipped this question**

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### Page 7: Strengths, Challenges & External Influences

## Instructional Comprehensive Program Review

**Q40** Please describe your program's strengths.

Dedicated Faculty:

With a new full-time faculty member (Robert Dutnall) joining our team in the Fall of 2018, we can boast three full-time instructors who are very dedicated to student success, equity and engagement. We are also lucky to have some amazing part-time instructors who have been indispensable as workshop leaders and mentors for students in our STEM cohorts. Of particular note is Rosana Pedroza, who in addition to the aforementioned roles has stepped up as the main coordinator for our allied health chemistry class (Chem 102). Moreover, she completely overhauled the lab manual for Chem 102 to provide a much-improved experience for the students. Another one of our part-time chemistry instructors, Fred Chambers, has lead multiple field trips to local Universities, biotech and engineering firms for STEM students.

Excellent Support Staff:

Having worked at a lot of different colleges over the years, I can say with confidence that our support staff in chemistry (and the science/engineering department as a whole) is second to none. The amount of work that goes into making sure our chemistry lab classes run smoothly every day is enormous and our technicians handle it incredibly well. This is despite numerous challenges related to the addition of more classes over the last several years, which will be discussed in the next section. Thanks to our wonderful chemistry technicians (Violeta Casillas and Elizabeth Hill), our chemistry preparation area is a well-oiled machine that creates an exceptional learning environment for our students and faculty in the lab classrooms.

High Fill Rates in our Chemistry Classes:

We are fortunate to have consistently high fill rates in our chemistry classes, averaging 104% over the past five years. Moreover there was only one semester over this time period in which the fill rate was under 100% (The overall fill rate was 92% in Fall 2013).

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## Instructional Comprehensive Program Review

### Q41 Please describe your program's challenges.

#### Staffing:

As mentioned previously, we are thrilled to have a third full-time faculty member in our discipline as of Fall 2018. However, the majority of our classes are still taught by part-time instructors. We are lucky to have some very dedicated and relied-upon part-time instructors, but we have found it challenging to staff all of our classes as we've added sections to meet growing demand. Ironically, the most difficult semester to staff in recent memory was the same semester we added the new full-time faculty member. Prior to Fall 2018 we had an extremely high turnover of part-time instructors with folks taking on full-time jobs, moving out of town, retiring, etc. Unfortunately, the district part-time instructor pool in chemistry is relatively small and not often teeming with quality candidates that are available, and so we found ourselves scrambling to find instructors. Of course the students in our program suffer the most when we end up hiring less than ideal candidates out of desperation. To be clear, we have no problem hiring newer, less experienced part-time instructors. We are happy to mentor them to facilitate improvement in the classroom. This has worked quite well in some cases. However, we've also hired instructors with plenty of experience who don't show an appropriate level of dedication to their students. We try to evaluate instructors early in the semester so we can provide feedback in the hopes that some adjustments will be made where necessary. However, too often we've found some folks to be unreceptive. In the last few years we've even had a couple of more extreme cases where an instructor needed to be replaced mid-semester.

#### Strain on facilities and equipment:

Another consequence of adding sections over the last several years has been increased strain on our facilities. We currently only have two chemistry lab rooms at Cuyamaca College and it has been a challenge to cram more lab sections into the schedule, especially given that the lab classes are generally three hours long. Adding more sections means decreasing the amount of time between lab classes occurring in a given room. This leaves less time for the requisite breakdown, cleaning and setup that needs to happen between classes. Our lab technicians often struggle to get everything done in time for the next lab period. Moreover, we don't have enough lab lockers to accommodate the growing number of students so we've had to turn equipment cabinets into makeshift lockers. This then required us to find places to re-house the equipment. When that option was tapped out, we had to purchase additional cabinets that take up space in our chemistry prep area to use as student 'lockers'.

Having more students in our classes also means more wear and tear on equipment. Given the amount of specialized equipment (glassware, hotplates, clamps, computers, instruments, etc.) needed for our lab classes, the increased need to replace equipment gets quite expensive and more difficult for our technicians to deal with.

#### Less than ideal lecture classrooms:

Most of the classrooms that are available for our chemistry lecture classes are not ideal for modern lecture techniques, and thus limit our ability to employ active learning exercises. Two of these rooms in particular, F-408 and F-702, are especially cramped with desks so close together that it makes it difficult for anyone to move around the room. Sometimes these desks are pushed all the way up against the instructor bench in the front. This setup makes group activities nearly impossible. Moreover, most of our chemistry instructors like to use a combination of PowerPoint slides and whiteboard work, which is challenging when the projector screen covers up a significant amount of the board space. Board visibility is also a problem as students in the front left side of the room will struggle to see notes that are written on the board space to the right of the screen, and vice versa.

## Instructional Comprehensive Program Review

**Q42** Please describe external influences that affect your program (both positively and negatively).

Positive:

- San Diego has ample jobs in STEM, medical and allied health fields. We are ranked third in the nation in the Biotechnology sector, which means there are a lot of local opportunities for students.
- We have great connections with the local Universities (SDSU, UCSD, USD), which have provided a plethora of research opportunities for our students.
- Nearly all of our science and allied health majors are required to take chemistry classes, which keeps our enrollments up.
- In 2017 Cuyamaca College was selected as one of only 20 Guided Pathway Colleges in California. This, in conjunction with our federally funded STEM Guided Pathways grant, has provided additional support and driven us to create, develop and implement novel interventions for our students.

Negative:

Pre-college preparation is often lacking (basic skills such as math, writing, etc.) due to decades of cuts in California public education funding and other factors.

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Page 8: V. Previous Goals: Update (If Applicable)

**Q43** Would you like to provide an update for your previous Goal(s)? **Yes**

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Page 9: Previous Goal 1

**Q44** Previous Goal 1:

Data Collection/STEM Student Identification

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**Q45** Link to College Strategic Goal(s): **Guided Student Pathways**, **Student Validation and Engagement**

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**Q46** Goal Status **Completed**

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## Instructional Comprehensive Program Review

**Q47** How was the goal evaluated? If the goal is "in progress," how will it be evaluated?

Two faculty members in the Science/Engineering department administered STEM surveys over several semesters to find out more about our students in order to better serve them. The goal was to gain information that was not readily available to us. The student information gleaned from the surveys included ethnicity (we included Middle Eastern as a category, which was not being tracked by the College), disabilities, whether the students were foster youth, veterans, working while going to school (and if so how many hours), native English speakers, and whether they received an education plan from counseling at Cuyamama. From the data collected, we were able to pinpoint serious issues for our students in the STEM & Allied Health area: (1) Many of our students are non-native speakers and, thus, may have challenges with reading and writing skills — yet another hurdle to academic retention and success for students in STEM and Allied Health majors; (2) many of our students work long hours which can deter students from achieving success in demanding and rigorous coursework in the STEM disciplines and, most certainly, can prevent students from taking advantage of tutoring hours, and/or attending STEM workshops/events; (3) just about half of our students do NOT have educational plans. The result of this means that students may take classes out of the proper sequence (this is particularly an issue for allied health students)/ this can result in a lack of success and/or retention or taking classes in a sequence that needlessly prolongs their progress at Cuyamaca preventing them from transferring or graduating in a timely fashion or in proceeding at all; (4) some of our students have special needs. It is helpful for us to know who they are and work to ensure that they are supported in appropriate ways.

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**Q48** Please provide the rationale for this goal:

**Respondent skipped this question**

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**Q49** Please provide the goal action steps for the year (previously "Activities"):

**Respondent skipped this question**

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**Q50** Do you have another goal to update?

**Yes**

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Page 10: Previous Goal 2

**Q51** Previous Goal 2:

Success in STEM Presentations/Workshops/Interventions

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**Q52** Link to College Strategic Goal(s):

**Guided Student Pathways**,  
**Student Validation and Engagement**

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**Q53** Goal Status

**In Progress - will carry this goal forward into this year's comprehensive program review**

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**Q54** How was the goal evaluated? If the goal is "in progress," how will it be evaluated?

With the help of the campus Institutional Effectiveness Division, we are collecting data and administering surveys to assess the effectiveness of our student support activities. We will use these results to help shape our STEM presentations, workshops and other interventions. See Section VI of this report for more details.

## Instructional Comprehensive Program Review

**Q55** Please provide the rationale for this goal:

This activity serves as a series of interventions to promote increased STEM participation and academic success, and is part of our Guided Pathways Project funded by the U.S. Department of Education.

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**Q56** Please provide the goal action steps for the year (previously "Activities"):

Informational presentations/workshops/events designed specifically for STEM and Allied Health students will continue to be offered in the coming year. Some highlights from the recent past include Careers in Engineering, Careers at SDG&E, general Summer Research Opportunities, and those presented by institutions offering them, such as STARS Program at UCSD, 4Cs at UCSD, Scripps Research Translational Institute, panels of professionals and/or students on the topics of Careers in Allied Health, Medical Careers, the Nursing Program at CSUSM, Alumni discussion of the transfer process and experiences, Alumni discussion of summer research experiences, cohort panel presentation of their experiences at Summer Research Week at USD, Mole Day Celebration, Pi Day Event, Success in STEM showcasing all student support activities, resources and events at the college. Monthly schedules for workshops & events are available to all students in the STEM Center. In addition, career sheets and course sequence sheets have been created and are distributed in classrooms, workshops and events.

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**Q57** Do you have another goal to update? **No**

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Page 11: Previous Goal 3

**Q58** Previous Goal 3: **Respondent skipped this question**

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**Q59** Link to College Strategic Goal(s) **Respondent skipped this question**

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**Q60** Goal Status **Respondent skipped this question**

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**Q61** How was the goal evaluated? If the goal is "in progress," how will it be evaluated? **Respondent skipped this question**

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**Q62** Please provide the rationale for this goal: **Respondent skipped this question**

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**Q63** Please provide the goal action steps for the year (previously "Activities"): **Respondent skipped this question**

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**Q64** Do you have another goal to update? **Respondent skipped this question**

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Page 12: Previous Goal 4

**Q65** Previous Goal 4: **Respondent skipped this question**

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## Instructional Comprehensive Program Review

**Q66** Link to College Strategic Goal(s)

Respondent skipped this question

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**Q67** Goal Status

Respondent skipped this question

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**Q68** How was the goal evaluated? If the goal is "in progress," how will it be evaluated?

Respondent skipped this question

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**Q69** Please provide the rationale for this goal:

Respondent skipped this question

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**Q70** Please provide the goal action steps for the year (previously "Activities"):

Respondent skipped this question

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Page 13: VI. New Goals

**Q71** Would you like to submit any new goal(s)?

Yes

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Page 14: New Goal 1

**Q72** New Goal 1:

Measurement of Effectiveness of the STEM Guided Pathways Project through Data Collection and Analysis

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**Q73** Link to College Strategic Goal

Guided Student Pathways ,  
Student Validation and Engagement

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**Q74** Please provide the rationale for this goal:

A host of new and unique student support activities and interventions have been implemented since the start of the HSI-STEM grant project. We need to track their effectiveness in order to see what's working and build upon them in the future.

---

## Instructional Comprehensive Program Review

**Q75** Please provide the goal action steps for the year (previously "Activities"):

Working with the Institute for Evidence-Based Change (IEBC) and the campus Institutional Effectiveness Division, STEM majors and cohort student data is being collected and studied to gain an understanding of Cuyamaca STEM student population demographics, implementation of the various interventions, including STEM Counseling, support courses, Faculty Mentorship, STEM cohort science identity, student success, student retention and time to transfer, among others. Early results provided by Institutional Effectiveness are promising. These results compare the success and retention of our STEM cohort students versus STEM students in general. While the majority of the support services mentioned above are available to all of our STEM students, the cohort students are required to take advantage of them and so tracking their progress can give us some indication of the effectiveness of these interventions. The sample size is still pretty small thus far, but the early data shows that 100% of our cohort students persisted from Fall 2017 to Spring 2018 versus only 69.2% for STEM students overall.

**Q76** How will the goal be evaluated?

Several evaluation activities are already underway and will be ongoing. Here is a list of data collection activities that have been carried out thus far:

- Administered the Test of Science Related Attitudes (TOSRA) to the students who completed the summer boot camp in August 2017, students in the science support course at the end of fall term 2017, and students in project science classes in spring term 2018
- Interviewed project faculty in spring 2018 about their experiences
- Interviewed project academic advisors in spring 2018
- Interviewed first cohort students in fall 2018
- Developed a comparison group of students and compared them to cohort students on key academic progress and success metrics

The results of these initial activities are currently under evaluation and the this type of data collection/evaluation cycle will be ongoing.

**Q77** Do you have another new goal?

**No**

Page 15: New Goal 2

**Q78** New Goal 2:

**Respondent skipped this question**

**Q79** Link to College Strategic Goal

**Respondent skipped this question**

**Q80** Please provide the rationale for this goal:

**Respondent skipped this question**

**Q81** Please provide the goal action steps for the year (previously "Activities"):

**Respondent skipped this question**

**Q82** How will the goal be evaluated?

**Respondent skipped this question**

**Q83** Do you have another new goal?

**Respondent skipped this question**

## Instructional Comprehensive Program Review

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Page 16: New Goal 3

**Q84** New Goal 3: Respondent skipped this question

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**Q85** Link to College Strategic Goal Respondent skipped this question

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**Q86** Please provide the rationale for this goal: Respondent skipped this question

---

**Q87** Please provide the goal action steps for the year (previously "Activities"): Respondent skipped this question

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**Q88** How will the goal be evaluated? Respondent skipped this question

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**Q89** Do you have another new goal? Respondent skipped this question

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Page 17: New Goal 4

**Q90** New Goal 4: Respondent skipped this question

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**Q91** Link to College Strategic Goal Respondent skipped this question

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**Q92** Please provide the rationale for this goal: Respondent skipped this question

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**Q93** Please provide the goal action steps for the year (previously "Activities"): Respondent skipped this question

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**Q94** How will the goal be evaluated? Respondent skipped this question

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**Q95** Do you have another new goal? Respondent skipped this question

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Page 18: Resources Needed to Fully Achieve Goal(s)

**Q96** Is the program requesting resources this year to achieve this goal? Respondent skipped this question

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Page 19: VII. Faculty Resource Needs

## Instructional Comprehensive Program Review

**Q97** Are you requesting one or more faculty positions to achieve this goal? **No**

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### Page 20: Faculty Position Request(s)

**Q98** Please remember to complete the Faculty Position Request Form (accessible here, under Staffing Request Information) for this position that you are requesting and upload it using the button below. The Faculty Position Request Form (In Word) can be located here (under Staffing Request Information). Brief Description of the Position Requested: **Respondent skipped this question**

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**Q99** Faculty Position Request 1 - Related Program Goal(s): **Respondent skipped this question**

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**Q100** Faculty Position Request Upload 1: Please upload the completed faculty request form using the button below. You can access the Word version of the Faculty Position Request Form here (under Staffing Request Information). **Respondent skipped this question**

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**Q101** Faculty Position Request 2 (if applicable): Please remember to complete the Faculty Position Request Form (accessible here, under Staffing Request Information) for this position that you are requesting and upload it using the button below. The Faculty Position Request Form (In Word) can be located here (under Staffing Request Information). Brief Description of Position Requested: **Respondent skipped this question**

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**Q102** Faculty Position Request 2 - Related Program Goal(s): **Respondent skipped this question**

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**Q103** Faculty Position Request Upload 2: Please upload the completed faculty request form button below. You can access the Word version of the Faculty Position Request Form here (under Staffing Request Information). **Respondent skipped this question**

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### Page 21: VIII. Classified Staff Resource Needs

**Q104** Are you requesting one or more classified positions to achieve this goal? **No**

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### Page 22: Classified Staff Position Request(s)

## Instructional Comprehensive Program Review

**Q105** Classified Staff Position Request 1: Please remember to complete the Classified Staff Position Request Form (accessible here, under Staffing Request Information) for this position you are requesting. Brief Description of Position Requested:

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**Respondent skipped this question**

**Q106** Classified Staff Position 1 Related Program Goal(s):

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**Respondent skipped this question**

**Q107** Classified Staff Position Request Upload 1: Please upload a completed Classified Position Request Form using the button below. You can access the Word version of the Classified Position Request Form here (under Staffing Request Information).

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**Respondent skipped this question**

**Q108** Classified Staff Position Request 2: Please remember to complete the Classified Staff Position Request Form (accessible here, under Staffing Request Information) for each position you are requesting. Brief Description of Position Requested:

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**Respondent skipped this question**

**Q109** Classified Staff Position 2 Related Program Goal(s):

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**Respondent skipped this question**

**Q110** Classified Staff Position Request Upload 2: Please upload a completed Classified Position Request Form using the button below. You can access the Word version of the Classified Position Request Form here (under Staffing Request Information).

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**Respondent skipped this question**

Page 23: IX. Technology Resource Needs

**Q111** Are you requesting technology resources to achieve this goal?

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**Yes**

Page 24: Technology Request(s)

## Instructional Comprehensive Program Review

**Q112** Technology Request 1: Please remember to complete a Technology Request Form for each request. You can access the online Technology Request Form here: [Technology Request Form](#).

Description:

**New office computer for a faculty member (Robert Anness) to replace an outdated Mac computer that will no longer run essential programs (including Canvas!). The specific request is for a 21.5-inch iMac with Retina display and 16GB of memory.**

One time or On-going

**One time**

Amount Requested \$

**\$1,552**

Related Program Review Goal:

**Properly equipping instructors with the tools that they need is crucial for serving our students. A fully functioning office computer is absolutely necessary for the development of resources, student evaluation materials, and computer-related activities to promote active learning and student engagement.**

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**Q113** Technology Request 2: Please remember to complete a Technology Request Form for each request. You can access the online Technology Request Form here: [Technology Request Form](#).

**Respondent skipped this question**

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Page 25: X. Perkins and Strong Workforce Resource Needs

**Q114** Are you requesting Perkins and/or Strong Workforce resources to achieve this goal?

**No**

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Page 26: Perkins Request and Strong Workforce

**Q115** Perkins Request and Strong Workforce 1: Please remember to complete the Perkins Request Form and submit it via the annual Perkins/Strong Workforce request process/cycle.

**Respondent skipped this question**

**Q116** Perkins Request and Strong Workforce 2: Please remember to complete the Perkins Request Form and submit it via the annual Perkins/Strong Workforce request process/cycle.

**Respondent skipped this question**

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Page 27: XI. Supplies/Equipment Resource Needs

**Q117** Are you requesting supplies and/or equipment resources to achieve this goal?

**No**

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Page 28: Supplies/Equipment Request(s)

## Instructional Comprehensive Program Review

**Q118** Supplies/Equipment Request 1: In the boxes below please provide information on your request. Respondent skipped this question  
Supplies/Equipment requests will be considered on a one-time funding basis.

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**Q119** Supplies/Equipment Documentation 1: Please upload any supplies/equipment quotes or additional documentation for this request. Respondent skipped this question

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**Q120** Supplies/Equipment Request 2: In the boxes below please provide information on your request. Respondent skipped this question  
Supplies/Equipment requests will be considered on a one-time funding basis.

---

**Q121** Supplies/Equipment Documentation 2: Please upload any supplies/equipment quotes or additional documentation for this request. Respondent skipped this question

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### Page 29: XII. Facilities Resource Needs

**Q122** Are you requesting facilities resources to achieve this goal? No

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### Page 30: Facilities Request

**Q123** Facilities Request 1: Please provide the information below and remember to complete the online Facilities Request Form, accessible here: Facilities Request Form Respondent skipped this question

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**Q124** Facilities Request 2: Please provide the information below and remember to complete the online Facilities Request Form, accessible here: Facilities Request Form Respondent skipped this question

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### Page 31: XIII. Professional Development Resource Needs

**Q125** Are you requesting professional development resources to achieve this goal? No

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### Page 32: Professional Development Request

## Instructional Comprehensive Program Review

**Q126** Professional Development Request 1: Please provide the information identified below and follow the process for requesting professional development funds, outlined here.

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**Respondent skipped this question**

**Q127** Professional Development Request 2: Please provide the information identified below and follow the process for requesting professional development funds, outlined here.

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**Respondent skipped this question**

Page 33: XIV. Other Resource Needs

**Q128** Are you requesting any other resources to achieve this goal? **No**

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Page 34: Other Resource Request

**Q129** Other Resource Request 1: Other resource requests will be considered on a one-time funding basis. Please fill in the information below.

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**Respondent skipped this question**

**Q130** Other Resource Request 2: Other resource requests will be considered on a one-time funding basis. Please fill in the information below.

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**Respondent skipped this question**

Page 35: Executive Summary

## Instructional Comprehensive Program Review

### Q131 Executive Summary

The Chemistry program at Cuyamaca College provides a rigorous, but well-balanced set of classes that primarily serves students on two distinct tracks of study: Science/Engineering or Allied Health. Students on the science/engineering track generally need to take anywhere from one to all four of our transfer-level chemistry courses depending on their major. Allied Health students take our Chemistry 102 class, which is an accelerated course that introduces them to general chemistry, organic chemistry, and biochemistry in one semester. The chemistry faculty at Cuyamaca College are dedicated to a student-centered approach to instruction, which employs active-learning and project-based learning activities in our classrooms. Our laboratory classes are made possible by our amazing chemistry technicians who provide an exceptional learning environment for our students.

We are lucky to have fill rates in our classes that consistently average over 100 percent, however we have faced some challenges as we've added sections over the last several years to meet the high demand. It has been difficult to staff all of our classes from the relatively small part-time instructor pool in chemistry. We also struggle with consistency with regard to the quality of instruction among the various sections due to the high turnover rate of part-time instructors. Additional sections has also meant more strain on our facilities and equipment. We currently only have two chemistry laboratory rooms and so we have to schedule lab classes close together, which leaves less time for breakdown and setup between sections. We've also had to get creative with regard to student lab lockers and storage of equipment as we've run out of space in these rooms. There is a plan in motion to expand the H-building and create a new chemistry lab for our entry-level courses, which should much improve the situation.

One of the things that makes it great to work within the chemistry discipline and the science/engineering department at Cuyamaca College is the significant emphasis put on student success, equity and engagement. With recognition of the myriad challenges our students face and the reality of low success rates in our entry level courses, efforts began several years ago to create a more supportive ecosystem for our students. These efforts have been given a huge boost with the award of a \$6 million HSI-STEM Guided Pathways grant in 2016. This incredible award alongside student equity funds has driven us to develop and create unique opportunities for our students, with an emphasis on support for disproportionately impacted and first-entering students. Working with other STEM disciplines we have employed a multi-pronged approach to strengthen STEM pathways and student engagement inside and outside the classroom. Student support activities include improved outreach to first-entering students, course sequence and career sheets, dedicated STEM counseling, enhanced instructional support (STEM tutoring and support workshops in academic skills, including soft skills such as writing and communication), faculty mentoring for STEM cohort students, pre-semester Gear Up For Success workshops for students enrolled in our entry-level courses, specialized STEM & Allied Health informational events and research partnerships with four year institutions, as well as internships for all STEM students. Moreover, room F-606 has gotten a major overhaul to transform it into an active learning classroom, and we are working to tie more of our SLO/PLO assessments to active-learning activities and projects.

Working with the Cuyamaca College Institutional Effectiveness Division, we are collecting data to measure the effectiveness of our student support interventions. It is our goal to use ongoing analysis of the data to continually evolve and improve upon existing support structures, while also creating new and innovative opportunities for student engagement.

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**Q132** Are you ready to submit your program review? If you click "No," you will be redirected to the start of the program review module. **Yes**

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