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Page 1: I. Program Overview and Update

Q1

1. Department(s) Reviewed:

Chemistry

Q2

2. Lead Author:

Robert Anness

Q3

3. Collaborator(s) - List any person that participated in the preparation of this report:

Rosana Pedroza, Violeta Casillas, and Robert Dutnall

Q4

4. Dean/Manager:

Kim Dudzik

Q5

5. Initial Collaboration Date with Dean:

Date your program met with **12/09/2022**
 your dean to discuss your
 vision, goals, and resource
 needs/requests:
 MM/DD/YYYY

Page 2: II. Program Reflection and Description

Q6

6. Provide your program's mission statement. If your program does not have a mission statement, what is your timeline for creating a 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.

Q7

Yes

7. Is the program description in the current college catalog up to date and accurate?

Q8

8. Describe how your program advances the College's new vision of equity, excellence, and social justice through education? How does the program reflect the College's mission and values?

Over the last several years the Chemistry Department at Cuyamaca College has been collaborating with faculty from biology, physics and engineering to develop and enhance existing parts of a comprehensive network of student support for STEM students. This work has been carried out with the goal of providing significant assistance to disproportionately impacted students in an effort to close equity gaps as much as possible. The work was bolstered by the award of a Department of Education Title III HSI-STEM grant entitled STEM Guided Pathways and Transformational Teaching Practices. The grant was awarded in October of 2016 and it had an annual budget of \$1.2 million for a 5-year period. This grant project addressed key challenges and sought opportunities for innovation and improvement. There was a focus on building and supporting a STEM Guided Pathway in the Science & Engineering Departments, 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 have included 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've also hosted a variety of panel discussions, presentations and events related to STEM careers and summer research opportunities for students. Faculty training and mentorship of students has been an important aspect of our grant-related work as well. Unfortunately, over the last couple of years our efforts were largely stifled due to the onset of the pandemic and the inability to use the STEM center in the H-Building due to the campus closure. However, while most of these activities ground to an abrupt halt at the start of the pandemic, efforts have been made more recently to resume as many student support interventions as possible, albeit in modified form, and to create new ones. For example, the boot camp and summer research experiences were modified to be online activities. STEM counseling and student mentoring have continued online as well. Embedded Learning Assistants (ELAs) were piloted in high-risk courses including Chemistry 102 and 120 during the Fall 2020 semester. The Assistants led co-curricular and extracurricular workshops, open study group sessions, guided homework and test preparation sessions. Perception data collected at the end of each session reflected positive student experiences. In Fall 2020, 86% of participants strongly agreed that the value they obtained from attending the sessions was worth the time invested. However, the results from the first couple of semesters of the ELA pilot program have been mixed. On the positive side, students in Chem 120 sections with an embedded learning assistant experienced higher retention (90%) and success rates (67%) when compared to the college-wide population enrolled in Chem 120 without an ELA (80% and 57%, respectively). Results for Chem 102 were less promising as students enrolled in ELA sections experienced lower retention (73%) and success rates (57%) compared to those in non-ELA Chem 102 sections (92% and 83%, respectively). These mixed results suggest further refinement of the ELA program is necessary. Focus groups were conducted for students, faculty and participants to assess future improvements. These groups highlighted a need for a more formal training program for ELAs and faculty. Also, it should be noted that attendance in ELA-led sessions was inconsistent among students, and focus group commentary suggested that students who participated in workshops were not the ones who need the most assistance. Although the Title III HSI-STEM grant period has come to an end, we have been able to continue ACP-embedded counseling in STEM for the time-being. Our department recently worked with counseling faculty to create updated degree maps to provide clarity to students and help them complete their classes in a timely manner. We also have an ACP lead for STEM (Christina Burnett) to help coordinate and facilitate student support networks and activities.

Page 3: III. Course Curriculum, Assessment and Student Success

Q9**Yes**

9. Access the Five Year Curriculum Review Cycle (requires GCCCD login). Have all of your active course outlines been reviewed within the last five years?

Q10

10. Please list any planned changes from the current semester forward for curriculum (courses, degrees, and/or certificates) and the rationale for those changes (e.g., labor market data, advisory committee recommendations, transfer institution changes, industry trends, statewide transfer model curriculum).

Over the last several years, most of the changes to our chemistry course curricula 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 an ongoing commitment to incorporating more project-based and active learning components in all of our classes.

One of our new goals (discussed in more detail later in this report) will be to assess our introductory general chemistry course (Chem 120) through an equity lens to seek out issues leading to the lowest success and retention rates in our program. This class has been without a full-time faculty coordinator since the Spring of 2020 due to a retirement in the department. This reality, alongside the temporary modification of laboratory curriculum in all of our classes to an online format due to the COVID-19 pandemic, has significantly hampered our ability to put the necessary focus on Chemistry 120 over the last couple years. Fortunately, we are on track to hire a new tenure-track chemistry instructor beginning in Fall 2023 that will ultimately take on this important coordinator role. We will need an all hands on deck approach in our department to decide what changes are necessary to significantly increase success rates and minimize or eliminate equity gaps in chemistry 120.

Q11

11. How is your program meeting the needs of students, and/or articulation with four-year institutions?

The chemistry program offers the full set of chemistry courses that a STEM major would need for transfer to a four-year institution. All but the two highest level chemistry courses are offered every semester. Our organic chemistry classes, Chemistry 231 and 232, are offered in Fall and Spring, respectively. We did offer both Chem 231 and Chem 232 in the Spring of 2020 for the first time, but we've had to scale back sections since the COVID-19 pandemic. We ultimately would like to offer Chem 231 every semester once it makes sense to do so.

The chemistry program also offers a one-semester accelerated chemistry course (Chem 102) that meets the chemistry requirement for most allied-health majors.

Q12

Respondent skipped this question

12. Please upload the most recent version of your program's course SLO assessment plan. [Click here for Assessment Plan Template.](#)

Q13

13. Please provide a high-level summary and your program's interpretation of your SLO findings over the past year.

Through discussions with SLO coordinator Tania Jabour and others, as well as an evolving understanding of how best to develop and use outcomes assessment in the classroom, we recognized that some of our chemistry classes had too many SLOs. For example, Chem 102 had 12 SLOs while Chem 120 and Chem 231 each had 7. Rather than continue with our current SLO assessment plan for these courses, we decided that it would be best to rewrite the SLOs for these classes. These changes were finalized, and updated course outlines were submitted to curriculum during the Spring 2022 semester. While a new assessment cycle plan still needs to be created based on the revised SLOs, we did resume assessment during the Spring 2021 semester. The SLO coordinators have suggested assessing all SLOs for a particular class during a given semester, and then reassessing in accordance with an assessment cycle plan, or more often if desired. The chemistry department adopted this approach as of Spring 2021, and we submitted assessment results for two of our classes (3 sections of Chem 102 and 2 sections of Chem 232) where all (or nearly all) SLOs were assessed. We are continuing along those lines this Fall 2022 and assessing all SLOs for our sections of Chem 120, Chem 141, Chem 142 and Chem 231. If we successfully follow through on this plan, then we will have assessed SLOs in all of our currently offered classes over two-semesters (Spring and Fall 2022). This will give us a baseline of information to discuss at upcoming department SLO meetings, allow us to focus on problem areas in our courses and brainstorm ideas to improve results. We can also use subsequent semesters in the four-year cycle for PLO assessment and reassessments of specific SLOs.

Q14

14. Discuss what changes, if any, were made as a result of your SLO findings. Include any student learning-related successes and/or challenges SLO results have revealed for your department.

Chemistry 102 was one of the courses in which the SLOs was revised recently, and we decided to assess the new set of SLOs during the Spring 2022 semester. One thing we have noticed in this class over the years is that SLOs assessed at the end of the semester tend to give less successful results than those assessed earlier. This may be related to a certain amount of stress and fatigue that sets in by the end of this accelerated class. Chem 102 is a course for allied health majors that gives students an overview of general chemistry, organic chemistry and biochemistry in a single semester. The material is very challenging for these students and they can tend to feel pretty overloaded by the end of the semester. One idea to address this issue is to replace the students' fourth exam with a project (such as a poster or PowerPoint presentation) that incorporates the key concepts that would have been tested on the exam. There would be ample opportunities for feedback as they work on their project and hopefully this would alleviate some of the stress that builds up around this time of the semester, allowing them to finish more strongly. This project would be used as an assessment tool related to one or more of the course SLOs. In general, we have found that exam-based assessments, particularly in our introductory courses, often give undesirable results. This is likely in part a result of the stress and anxiety associated with exams. With this in mind we plan to work toward meaningful SLO assessments that are not tied to exams or quizzes.

Page 4: IV. Degree and Certificate Programs

Q15**Yes**

15. Does your program offer any degree/certificate programs?

Page 5: IV. Degree and Certificate Programs

Q16

16. For each degree and certificate, indicate how many awards were conferred in the past 5-years. Please comment on any trends and provide context to explain any increases or decreases.

[cuyamaca-pr-data-2022-2023-college-wide-certs-and-degrees-awarded-excel-20220811.pdf \(51.3KB\)](#)

Q17

17. Please indicate when each degree and certificate was last reviewed and updated (semester), if this information is available (e.g., via internal program records or Curriculum Committee minutes). If you are unable to locate this information, please state that.

Twelve A.S. degrees in Chemistry were awarded over the past 5 years. Given the small number of degrees conferred each year, it is difficult to identify any particular trends. Most of our STEM students are focused on transfer to a four-year institution, and so very few seek to obtain A.S. degrees. I'm not sure when this degree was last reviewed and updated.

Q18**Yes**

18. Can students complete the degree/certificate requirements within a two-year period? **Requirement of Title 5, California Code of Regulations and Accreditation Standard II.A.

Q19**Yes**

19. Have you updated your program learning outcomes (PLOs) since 2020?

Q20**Yes**

20. Does your program share some PLOs across its Academic and Career Pathway (ACP)?

Q21

21. How are you currently assessing your PLOs? If you are not currently assessing PLOs, what is your plan to assess PLOs in the future?

The STEM Department Chairs collaborated in August 2021 to create a set of PLOs that apply to our ACP as a whole. These along with chemistry-specific PLOs will be assessed as part of our four-year assessment cycle, and they will be mapped to existing SLOs.

Q22

22. How are your PLO assessments informing improvements/changes to your program?

PLO assessment up to this point has been very limited so it has not yet informed any changes to our program. With new ACP-specific PLOs now integrated into our assessment plan, we should be able to obtain valuable information to help us improve our program moving forward.

Page 6: IV. Degree and Certificate Programs continued

Q23

23. Looking at the past 4-5 years of enrollment in your program, what trends do you notice? Has enrollment increased or decreased, and what factors may be contributing to this?

Enrollments in chemistry have varied over the last 5 years. After an enrollment drop from Fall 2017 to Spring 2018, there was a steady increase in chemistry enrollments over the next several semesters with the highest enrolled semester being Spring 2020. Enrollment dropped steadily in subsequent semesters with the steepest decline between Fall 2021 and Spring 2022. Looking back at the last decade it is notable that the chemistry department had been adding sections to meet growing demand, which resulted in an increasing enrollment trend for most of those years. For example, census enrollment was 242 students in Fall 2013 and grew to its peak of 458 in Spring 2020. Contributing to the peak enrollment semester was the addition of a new chemistry lab, which allowed us to add sections beyond the capacity available in previous semesters. Unfortunately our enrollment has dropped in each semester since then, with a steep dip from Fall 2021 to Spring 2022 from 346 to 246, respectively. The most significant factor contributing to the decline in enrollment appears to be related to the COVID-19 pandemic, given that enrollments started to go down in Fall 2020. At the outset of pandemic, programs were asked to cut sections across the board to reduce costs in uncertain times, which caused an initial drop in enrollment. However, enrollments in ongoing sections of our chemistry classes started to decline also, forcing us to cancel classes (in Spring and Fall 2022) for the first time in recent memory.

Q24

24. What is your department's overall course success rate? How has it changed over the past 4-5 years? Please note any trends and context for the data.

The chemistry department's overall success rate has ranged from 65% to 79% over the last five years, averaging 72%. With slight variations up and down over the period, it's difficult to detect any notable trends.

Q25

25. Please review the college-wide and program data sets, which have identified equity gaps based on the following criteria: 3% n=10 students/enrollments. Which groups are experiencing equity gaps in your program for success rate and/or retention rate? Please discuss all equity gaps identified in the data.

Both male and female chemistry students have tended to have success rates that are very close to the overall success rate in chemistry (72%) over the past five years. Female students tended to have success rates that were slightly higher (73%) than the average success rate in any given semester while male students tended to be slightly lower (70%), but no equity gap is discernible from the data.

Chemistry success rates with regard to ethnicity were analyzed by comparing success rates of particular groups as a percent difference from the average rates. Comparing our two largest groups first (White, Non-Hispanic and Hispanic), there is a significant equity gap evidenced by their success rates. While white, non-Hispanic students had higher success rates than the overall rate (averaging 11% above average) over the past five years, Hispanic/Latinx students had lower success rates each semester (averaging 16% 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 quite small. However, it should be noted that while the success rates for Asian students tended to be above the average most semesters (averaging 9% above), African-American students had below average success rates in all but one semester over the past five years (averaging 31% below average), representing a significant equity gap.

Q26

26. What department/discipline (or institutional) factors may be contributing to these lower rates of success for these groups of students?

While no single program or institution can address all of the societal factors that negatively affect so many of our students, it is our job to understand and minimize the effects of these factors as much as possible. In our program, and STEM classes in general, we have seen large equity gaps among disproportionately impacted groups such as Hispanic/Latinx and African American students. Systemic racism in society and its institutions had meant that more of these students will be low-income and/or first-generation College students. Moreover, these students may not see themselves represented in departments or disciplines that lack diversity among the faculty and/or the student body. It is heartening to be at a College that is committed to an anti-racist, equity-driven approach to education at a time when there are coordinated attacks against this type of approach in all levels of education (K-12, higher ed) nationwide. The Title III HSI-STEM grant mentioned earlier in this report was designed to address many of the institutional factors by building community among STEM students, providing STEM-centered counseling, faculty and student mentors, and Success in STEM workshops and activities. Since the grant funding period has recently come to an end, STEM faculty, staff and administrators are working toward securing funding to maintain as many as these supports as possible while also creating new ones.

Q27

27. What action will the department or discipline take to address these equity gaps over the next four years? If equity gaps have been reduced or eliminated, please share what the program did to achieve this. If equity gaps still exist, consider the specific steps your department will take to address equity gaps.

Our preparatory chemistry course, Chemistry 120 has the lowest success rate, averaging 54% from Fall 2017 to Spring 2022, compared to approximately 72% for chemistry as a whole over the same time frame. The second lowest success rate over the last five years is 65% for Chem 102, which is our introductory chemistry class for allied health majors.

Given that the lowest success and retention rates are concentrated in our introductory chemistry courses (Chem 102 and 120), we continue to put the largest focus on providing support for students in those classes. For example, we would like to continue using the embedded learning assistant (ELA) program described in a previous section of this report for these courses. In response to focus group feedback, The STEM grant coordinators worked with the Cuyamaca College tutoring department, counseling services, and transfer center to provide extensive training to the ELA pool. In addition to collecting attendance, success and retention data for the ELA courses, student ELAs had been completing weekly journal reflections since the Spring 2021 semester. Since the Title III grant period has come to end, we will need to secure new funding for this program.

We will also be hosting pre-semester Gear Up for Success workshops for incoming Chem 102 and 120 students that focus on reviewing math skills, conducting problem solving activities, and highlighting good study strategies necessary for success in these courses.

While most of the focus has been on creating support activities and networks to aid students in these introductory chemistry class, a new goal for the next several years will be to take a hard look at our chemistry 120 class itself from a pedagogical standpoint and revamp it. The idea behind Chemistry 120 is that it will help students cultivate the study habits, lab skills, and content knowledge for them to be successful in their subsequent transfer-level chemistry courses. While this may be working for some students, unfortunately, overall Chemistry 120 seems to be operating less like a bridge to success and more like a filter that's holding many students back. It should be noted that there have been student-centered teaching practices implemented in Chem 120 over the last several years. These include flipped classroom activities and project-based learning activities such as poster presentations. Moreover, individual and group problem solving sessions during lecture are commonplace in this class, including organizing the class into pods. In this format each pod (group) gets assigned their own problem or problems to solve, and then they share their work with the rest of the class and demonstrate how they solved it. Despite this active-learning focus in this class, there has not been notable improvement in Chem 120 success rates over the last five years. Deeper departmental reflection and discussion through an equity lens will be needed to address these ongoing issues with retention and success rates, with the goal of significantly improving both.

Contributing to the challenges faced by Chemistry 120, the class has been somewhat rudderless since our long-time Chemistry 120 coordinator retired during the Spring 2020 semester. The other two remaining full-time instructors in the department coordinate our general chemistry series (Chem 141 and Chem 142) and our organic chemistry series (Chem 231 and Chem 232). A dedicated coordinator for each these areas within our discipline (preparatory chemistry, general chemistry and organic chemistry) is crucial for advancing the goals of the department. Fortunately, we are currently in the process of hiring a new full-time, tenure-track chemistry instructor with the plan that they will ultimately take on this coordinator role.

Q28

28. Discuss your program's plans for diversifying department faculty in alignment with the GCCCD Board Resolution 20-015. For assistance with this, please contact Cuyamaca's EEO site lead, Karen Marrujo at karen.marrujo@gcccd.edu.

Chemistry faculty pools at Cuyamaca College tend to be rather small, which can be a challenge when trying to promote and encourage faculty diversity. The chemistry department will work with District HR to ensure extensive outreach for this position with the hopes of diversifying the pool. This doesn't mean that we will simply rely on HR for this task, but that our department will actively seek out opportunities to expand outreach efforts. There are many organizations that exist to promote diversity in chemistry and they generally have a space for job postings. One example is the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE). From their website: "NOBCChE is a non-profit professional organization dedicated to assisting black and other minority students and professionals in fully realizing their potential in academic, professional and entrepreneurial pursuits in chemistry, chemical engineering and allied fields." The job announcement can be posted to their online Career Center. This is just one of many opportunities for outreach that can be utilized if efforts are made to seek them out. The American Chemical Society (ACS) has a host of resources to support the promotion of diversity and inclusion in academia.

Q29

29. What other qualitative or quantitative data, if any, is the program using to inform its planning for this comprehensive program review? Please reference additional internal or external data, such as retention and enrollment, student survey results, focus groups, student throughput, or other data, if there are any notable trends.

We have obtained data collected through the Title III HSI-STEM grant and the Embedded Learning Assistants (ELA) pilot program. This is discussed in previous sections of this report.

Q30

30. What did your program learn from the transition to remote teaching over the past few years? How can this be used to improve the student experience in the future?

The overall experience of converting all our chemistry classes to remote teaching has not been positive. The process put a much larger burden on instructors as we had to quickly learn multiple new software platforms for online lab instruction, homework, and testing, in addition to learning how to teach on Zoom. The complete revision of our lab curriculum to less effective, online platforms was an enormous undertaking. All of this has contributed to overwork and burnout among instructors in general. Students have also been highly demotivated as these challenging chemistry courses require focus that is difficult for many to maintain over Zoom, and without the community of their peers that is much more easily developed when students share physical lecture and lab spaces together for six to nine hours a week. Equity issues for students (and faculty) have been exacerbated as well given that access to technology varies widely, and not everyone has a home environment that is suitable for learning (or teaching). The experience over this last period has only reinforced how critical the in-person and hands-on aspects of our chemistry classes are to teaching and student learning. However, the skills learned by necessity over the past couple years via more in-depth Canvas training or by employing publisher software platforms are valuable, and much can be utilized in our chemistry courses as we transition back to face-to-face teaching. Instructors should definitely have an understanding of how to use Canvas much more effectively than they did before the pandemic. For example, the Canvas Discussion feature can be useful even when a class meets regularly in person to promote conversations that may be less suitable for class sessions. The Canvas training offered many other strategies for promoting student engagement and participation that will continue to be of value. In addition, the chemistry department has become much more familiar with textbook publisher software programs that weren't being utilized pre-pandemic. Though it is not likely that we will be using these platforms for exams and quizzes in face-to-face classes (as was the case during the switch to remote teaching), we are continuing to use the online homework, study guides and other practice resources offered by these platforms. Moreover, these platforms generally include an e-book copy of the text, and the full software bundle is always much less expensive than the cost of a new hardcopy of one of our chemistry textbooks.

Page 7: IV. Degree and Certificate Programs continued

Q31

No

31. Does your program offer courses via distance education, excluding emergency remote teaching 2020-21 (classes that would have been taught in person, if not for the pandemic)?

Page 8: IV. Degree and Certificates Programs continued

Q32

Respondent skipped this question

32. If there are differences in success rates for distance education (online) versus in-person classes, what will the program do to address these disparities? If there are no differences, what did the program do to achieve that?

Q33

Respondent skipped this question

33. What mechanisms are in place to ensure regular effective contact (Guided to Best Practices in Online Teaching) within online courses across the discipline or department?

Q34

Respondent skipped this question

34. What innovative tools and strategies are you using in your online courses to engage students and support student success?

Page 9: IV. Degree and Certificate Programs continued

Q35

No

35. Is your program a career education program (e.g., does it prepare student to directly enter the workforce)?

Page 10: IV. Degree and Certificate Programs continued

Q36

Respondent skipped this question

36. Please share your observations about the employment rate for your program over the past several years.

Q37

Respondent skipped this question

37. What is the institution-set standard for your program's employment rate? The institution set standard is what you would consider the lowest acceptable employment rate for your program (or "floor").

Q38

Respondent skipped this question

38. What would you like your program's employment rate to be, ideally (stretch goal)?

Page 11: IV. Degree and Certificate Programs continued

Q39

39. What is your program doing to prepare students for successful transition (e.g., transfer and career readiness)? Please include information on how your program is helping students explore careers in your program area.

Our program actively promotes Summer Research Opportunities for our students and posts these to our Canvas shells. We have had a significant percentage of our students take advantage of these relative to the small size of our College. We also promote programs designed for students who want to become health care professionals. The UniversityLink Medical Science Program (ULMSP) CA Medicine Scholars Program is one for students seeking careers in medicine, dentistry, pharmacy or veterinary medicine. This program was also promoted as part of a UCSD-sponsored Transfer Empowerment Seminar last Spring. In May, we hosted a Student Panel titled "Success in STEM: Transferring to a University" in our H-Building STEM Center. This panel featured students sharing their experiences after transferring to SDSU, UCSD, and CSU San Marcos. This panel also had a speaker from the Cuyamaca College transfer center to talk about resources and transfer assistance. Over the last several years we have hosted many events such as these related to transfer, research opportunities and career explorations, and we will continue to do so in the future.

Q40

40. What do the latest labor market data reveal about the careers (including those for transfer students) for which your program prepares students? Consider what career information you would share with students on a career or transfer pathway in your area. Labor market data may be sourced from the California Employment Development Department. You may also contact the Institutional Effectiveness, Success, and Equity Office to access additional labor market information related to your program.

Our program prepares students on two separate educational tracks. STEM majors generally seek careers in research and development or a health care profession such as Pharmacy, Dentistry or Medicine, while Allied Health majors are geared toward careers in nursing or as health care technicians. Fortunately, San Diego and its surrounding regions offer ample career options for our students.

EMSI data shows that the San Diego-Chula Vista-Carlsbad area is a hot spot for scientific research and development, and pharmaceutical manufacturing jobs. For these types of jobs the national average for a city of similar size is 908 employees, while there are 2,098 here. The number of job postings in these fields are 245 per month in our region versus an average of 75 postings nationwide for a similarly sized area.

The healthcare sector in San Diego County employs 186,000 workers, which comprises 5% of the population and 13% of overall employment according to San Diego Workforce Partnership. This makes healthcare San Diego's second biggest employer. One of the reasons for the large percentage of overall employment is because of San Diego's advanced medical research and biotechnology industries, which work together with local hospitals to provide cutting edge treatment. San Diego ranks #1 in the U.S. for genomic patents and is home to more than 80 research institutions and 30 hospitals.

Q41

Respondent skipped this question

OPTIONAL - If your program has labor market data to include in your program review, please use the upload button to attach the file.

Q42

41. Please describe your program's strengths.

Dedicated Faculty:

We have two full-time instructors who are very dedicated to student success, equity and engagement. Since the addition of Robert Dutnall as a full-time instructor in Fall of 2018 we have seen notable improvement in our success rates in the courses that he teaches and coordinates (Chem 141 and 142). Prior to his hire we were without a coordinator that could focus on developing and improving our general chemistry classes, since the two other full-time faculty members had to coordinate and develop other areas such as preparatory chemistry, allied health chemistry and organic chemistry. 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 taken on the main coordinator role 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, lead workshops and has helped to coordinate our Chemistry 120 class since the retirement of Laurie LeBlanc during the Spring 2020 semester.

Excellent Support Staff:

Our support staff in the chemistry department 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. Thanks to our wonderful chemistry technicians (Violeta Casillas, Elizabeth Hill, Maria Vazquez Ramos and shared Biology/Chem technician Megan Smith), 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 many of our chemistry classes, averaging 92.1% over the last 5 years (combining Fall and Spring terms from Fall 2017-Spring 2022) compared to 70.3% college-wide over the same period.

Q43

42. Please describe your program's challenges.

Staffing:

As mentioned previously, we are set to hire a new full-time chemistry instructor for Fall 2023. However, over the last couple years we have been down to two full-time instructors due to a retirement in Spring 2020, and the majority of our classes sections 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 in many cases. Unfortunately, the district part-time instructor pool in chemistry is relatively small and tends to lack quality candidates that are available, and so we found ourselves scrambling to find instructors. One example of this issue occurred when we tried to staff a Chemistry 102 class for Fall 2022. We interviewed several candidates from the pool, but none were available to teach the class due to day/time conflicts or already having full loads of classes elsewhere. We ended up having to cancel this section and opened a new section at a different time that one of our current part-time instructors was available to teach. However, since this new section was added late in the game (after registration had been open for a long time) it didn't fill to a significant extent so we had to cancel this one too.

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. Over 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 equipment:

Our chemistry laboratory classes require use of a large amount of equipment such as analytical instruments, glassware, measuring devices, hotplates, balances, centrifuges, etc. This equipment takes on a lot of wear and tear and need periodic calibration, repair and replacement. At times the chemistry budget is not large enough to handle our needs so we've included some supply requests with this program review to assist us with bigger ticket purchases and repairs.

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.

Q44

43. 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 a top-ranked Biotechnology sector in the nation, which translates to lots 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.

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. Moreover, underfunded schools are inherently inequitable.

Q45

44. Given these factors, what opportunities exist for the service area to advance the College's goals in the next 4 years?

Our department will continue to prepare our students for transfer and careers by promoting opportunities to participate in internships and research opportunities, and hosting informational events and career fairs.

We will also continue to collaborate with other departments to explore innovative pedagogical methods, while developing and enhancing student support networks to increase success and retention rates and eliminate equity gaps in our courses.

Page 13: V. Previous Goals

Q46

Previous Goal 1:

Success in STEM Presentations/Workshops/Interventions

Q47

In Progress

Goal Status

Page 14: V. Previous Goals continued

Q48

Respondent skipped this question

Please describe the results or explain the reason for the deletion/completion of the goal:

Q49**Respondent skipped this question**

Would you like to submit another previous goal?

Page 15: V. Previous Goals continued

Q50**Eliminate equity gaps in course success (passing grade in class)**

Which College Strategic Goal does this department goal most directly support? (Check only one)

Q51

Action Steps for the Next Year: If you are requesting resources in order to achieve this goal, please list them below as action steps and specify the type of request (e.g., submit technology request for new laptop computers).

This goal was originally tied to the Title III HSI-STEM Guided Pathways grant project, which has now reached the end of its funding period. This will limit some of the activities that were made possible by grant funding, but we will continue to promote and host success in STEM presentations, workshops and interventions as much as possible. Fortunately, we have secured STEM-specific counseling for the time being and we have a STEM ACP lead (Christina Burnett) to help coordinate activities. Summer Research Opportunities and other STEM internships will continue to be promoted to all of our chemistry students, and we will host in-person pre-semester "Gear Up for Success" workshops for incoming Chem 102 and 120 students. We will also continue to host and promote events related to STEM careers and transfer to four-year institutions.

We hope to secure funding for Chem 102 and 120 workshops run by instructors that would take place throughout the semester, as well as embedded learning assistants in these classes.

Q52

Other, please specify::

What resources, if any, are needed to achieve this goal in the next 4 years? Please select all that apply. Links to request forms are included below. All resource requests are due on the program review deadline.

Some activities will require additional funding from the college

Q53**Yes**

Would you like to submit another previous goal?

Page 16: V. Previous Goals continued

Q54

1. Previous Goal 2:

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

Q55**Completed**

3. Goal Status

Page 17: V. Previous Goals continued

Q56

Please describe the results or explain the reason for the deletion/completion of the goal:

The STEM Guided pathways project was funded by a 5-year Title III HSI-STEM grant whose funding period came to an end in 2021. Data Collection and analysis was coordinated by a team that was funded by this grant, and so this goal no longer has the resources to be carried out in the same way for the time being.

Q57**No**

Would you like to submit another previous goal?

Page 18: V. Previous Goals continued

Q58**Respondent skipped this question**

Which College Strategic Goal does this department goal most directly support? (Check only one)

Q59**Respondent skipped this question**

Action Steps for the Next Year: If you are requesting resources in order to achieve this goal, please list them below as action steps and specify the type of request (e.g., submit technology request for new laptop computers).

Q60**Respondent skipped this question**

What resources, if any, are needed to achieve this goal in the next 4 years? Please select all that apply. Links to request forms are included below. All resource requests are due on the program review deadline.

Q61**Respondent skipped this question**

Would you like to submit another previous goal?

Page 19: V. Previous Goals continued

Q62**Respondent skipped this question**

1. Previous Goal 3:

Q63**Respondent skipped this question**

3. Goal Status

Page 20: V. Previous Goals continued

Q64

Respondent skipped this question

Please describe the results or explain the reason for the deletion/completion of the goal:

Q65

Respondent skipped this question

Would you like to submit another previous goal?

Page 21: V. Previous Goals continued

Q66

Respondent skipped this question

Which College Strategic Goal does this department goal most directly support? (Check only one)

Q67

Respondent skipped this question

Action Steps for the Next Year: If you are requesting resources in order to achieve this goal, please list them below as action steps and specify the type of request (e.g., submit technology request for new laptop computers).

Q68

Respondent skipped this question

What resources, if any, are needed to achieve this goal in the next 4 years? Please select all that apply. Links to request forms are included below. All resource requests are due on the program review deadline.

Q69

Respondent skipped this question

Would you like to submit another previous goal?

Page 22: V. Previous Goals continued

Q70

Respondent skipped this question

1. Previous Goal 4:

Q71

Respondent skipped this question

Goal Status

Page 23: V. Previous Goals continued

Q72

Respondent skipped this question

Please describe the results or explain the reason for the deletion/completion of the goal:

Page 24: V. Previous Goals continued

Q73

Respondent skipped this question

Which College Strategic Goal does this department goal most directly support? (Check only one)

Q74

Respondent skipped this question

Action Steps for the Next Year: If you are requesting resources in order to achieve this goal, please list them below as action steps and specify the type of request (e.g., submit technology request for new laptop computers).

Q75

Respondent skipped this question

What resources, if any, are needed to achieve this goal in the next 4 years? Please select all that apply. Links to request forms are included below. All resource requests are due on the program review deadline.

Page 25: VI. New 4-Year Goals

Q76

New Goal 1:

Chemistry 120 data exploration to understand and address key factors contributing to low success and retention rates.

Q77

Eliminate equity gaps in course success (passing grade in class)

Which College Strategic Goal does this department goal most directly address? (Check only one)

Q78

Please describe how this goal advances the college strategic goal(s) identified above:

This goal is intended to garner information that will allow us to modify our teaching and learning practices in Chemistry 120 to eliminate equity gaps and increase success and retention rates for our students.

Q79

Please indicate how this goal was informed by SLO assessment results, PLO assessment results, student achievement data, or other data:

As mentioned earlier in this report, our introductory pre-transfer level chemistry course, Chemistry 120, has the lowest success and retention rates of any of our courses. (averaging 54% from Fall 2017 to Spring 2022, compared to approximately 72% for chemistry as a whole over the same time frame). Moreover, college data shows consistent equity gaps, particularly with African American and Hispanic/Latinx students.

Q80

Action Steps for this Year: If you are requesting resources in order to achieve this goal, please list them below as action steps and specify the type of request (e.g., submit technology request for new laptop computers).

The Chemistry Department faculty will meet to discuss ideas for innovative pedagogical approaches that could be used in the Chemistry 120 classroom to increase student engagement and content understanding. Our department is participating in a community of practice called the "SEED" program which will continue to be helpful in this regard. The SEED program is an interdepartmental collaboration between science and engineering faculty designed as a forum for sharing, fine-tuning and developing innovative and equity-minded teaching practices. We will need to devise data collection and analysis methods related to the new types of projects and teaching/learning practices that we employ.

Our department will also discuss new types of SLO assessments that are not tied to exams, and SLO data will be collected according to our program's four-year cycle.

We would like to secure funding for incorporating embedded learning assistants (ELAs) into our chemistry 120 classes. We had an opportunity to participate in the ELA pilot program in Fall 2020 and we saw positive results with regard to Chem 120 based on data collected via the Title III HSI-STEM grant as discussed earlier in this report. Since the grant funding period has ended, we will likely need to reach out to the Office of Institutional Effectiveness, Success and Equity (IESE) at Cuyamaca College to assist with data collection and analysis.

Q81**New faculty position**

What resources, if any, are needed to achieve this goal in the next 4 years? Please select all that apply. Links to request forms are included below. All resource requests are due on the program review deadline.

Q82

How will this goal be evaluated?

The Chemistry Department will continue to monitor college-wide data such as Chemistry 120 success and retention rates as new pedagogical methods are employed. We will also be using SLO data tied to new assessments, ELA data, and any other data we collect to measure the impact of any new practices we employ in Chem 120. The results of these data explorations will inform our teaching and learning practices moving forward, and we will modify our approach as needed. We are in the process of hiring a new tenure-track chemistry instructor for Fall 2023 that will teach, and ultimately coordinate Chemistry 120. Having a full-time coordinator for this class who shares our equity-minded vision will be key to a successful outcome with regard to this goal.

Q83**No**

Would you like to propose another new, 4-year goal?

Page 26: VI. 4-Year Goals continued

Q84**Respondent skipped this question**

Goal 2:

Q85**Respondent skipped this question**

Which College Strategic Goal does this department goal most directly support? (Check only one)

Q86**Respondent skipped this question**

Please describe how this goal advances the college strategic goal(s) identified above:

Q87**Respondent skipped this question**

Please indicate how this goal was informed by SLO assessment results, PLO assessment results, student achievement data, or other data:

Q88**Respondent skipped this question**

Action Steps for the Next Year: If you are requesting resources in order to achieve this goal, please list them below as action steps and specify the type of request (e.g., submit technology request for new laptop computers).

Q89**Respondent skipped this question**

What resources, if any, are needed to achieve this goal in the next 4 years? Please select all that apply. Links to request forms are included below. All resource requests are due on the program review deadline.

Q90**Respondent skipped this question**

How will this goal be evaluated?

Q91**Respondent skipped this question**

Would you like to propose another new, 4-year goal?

Page 27: VI. 4-Year Goals continued

Q92

Respondent skipped this question

Goal 3:

Q93

Respondent skipped this question

Which College Strategic Goal does this department goal most directly support? (Check only one)

Q94

Respondent skipped this question

Please describe how this goal advances the college strategic goal(s) identified above:

Q95

Respondent skipped this question

Please indicate how this goal was informed by SLO assessment results, PLO assessment results, student achievement data, or other data:

Q96

Respondent skipped this question

Action Steps for the Next Year: If you are requesting resources in order to achieve this goal, please list them below as action steps and specify the type of request (e.g., submit technology request for new laptop computers).

Q97

Respondent skipped this question

What resources, if any, are needed to achieve this goal in the next 4 years? Please select all that apply. Links to request forms are included below. All resource requests are due on the program review deadline.

Q98

Respondent skipped this question

How will this goal be evaluated?

Q99

Respondent skipped this question

Would you like to propose another new, 4-year goal?

Page 28: VI. 4-Year Goals continued

Q100

Respondent skipped this question

Goal 4:

Q101

Respondent skipped this question

Which College Strategic Goal does this department goal most directly support? (Check only one)

Q102

Respondent skipped this question

Please describe how this goal advances the college strategic goal(s) identified above:

Q103

Respondent skipped this question

Please indicate how this goal was informed by SLO assessment results, PLO assessment results, student achievement data, or other qualitative or quantitative data (from any source):

Q104

Respondent skipped this question

Action Steps for the Next Year: If you are requesting resources in order to achieve this goal, please list them below as action steps and specify the type of request (e.g., submit technology request for new laptop computers).

Q105

Respondent skipped this question

What resources, if any, are needed to achieve this goal in the next 4 years? Please select all that apply. Links to request forms are included below. All resource requests are due on the program review deadline.

Q106

Respondent skipped this question

How will this goal be evaluated?

Page 30: Final Check

Q107

I am ready to submit my program review

Are you ready to submit your program review? If you would like to go back and review a section, select a section and click "Next."
