Comprehensive Program Review Report

Program Review - Chemistry

Program Summary

2023-2024

Prepared by: Julie Rodriguez, Ryan Froese, Teresa Mendoza, Jennifer Verissimo, Chiara MacPherson, James Kawagoe
What are the strengths of your area?: One of the strengths of our chemistry program is the partnerships that students build with the faculty members. Unlike large, impersonal introductory courses at many colleges and universities, the chemistry classes at COS have a maximum enrollment of 24 students. Small classes and labs make certain that students receive individualized attention and ensure greater success in chemistry. Recently we have increased the number of chemistry classes offered in order to serve the greater student demand. (We have gone from fall-spring combined 185 FTES in 5 years ago to 253 FTES 2022-20223, from 1043 grades issues to 1277) To ensure this individualized attention for future years, an additional faculty member is needed.

Our dedication to teaching and supporting student learning is another strength of the department. Our faculty collaborate often and work well together to construct a successful chemistry program. We have established a Microsoft teams account for chemistry to better share materials and have discussions. One of our faculty had an IIP approved to revamp (and offer to the students at no cost!) a woefully out of date, confusing, and incomplete Chem 20 lab manual and we have collaboratively pooled issues, corrections, and additional labs to add over Microsoft teams. The full time faculty have been very active in improving their teaching and continuing to develop their classes. In the past year, Chem 1 and Chem 20 worksheets and materials were revised, prelab quizzes to increase lab preparation were made, supplemental lab packets were designed to help students fully grasp lab experiments, lecture videos to review or catch up were filmed, two instructors' hybrid chem20 were reviewed by RSI team, workshops and training were attended, including: how to be an awesome online instructor, how to begin class well, reviewing the course outline with equity in mind, cultural competency and pedagogy training: classroom practices, mental health awareness: identifying and intervening with at-risk students, what's the buzz on academic freedom, hyflex support, adobe acrobat, online teacher certification.

Additionally our commitment to student success has extended outside of the typical classroom setting: Jenny spearheaded the first (of hopefully many) field trip to promote careers in chemistry. James accompanied a student presenting at the American Chemical Society conference. Chiara taught a segment of Jumpstart this past summer to promote high school students to pursue healthcare careers. James and Chiara mentored the first Friday night lab chemistry project – to carry out a multi-step synthesis of caffeine based on piecing together several patents. And, as every year, numerous reference letters were written for scholarships, summer programs, and conferences.

Chemistry at the Tulare Center has seen significant improvements since Julie Rodriguez moved out to the center. The chemistry lab in B228 is now fully stocked with equipment to run all of our courses except for Organic Chemistry. Each year, Chemistry 1 and Chemistry 2 are now being taught at the center in addition to Chemistry 20. Calculus 1 is also being taught at the center right before Chemistry 1 and Chemistry 2 so that students can take both without needing to commute to Visalia. The MESA Center has also started a Pop-Up location in Building B to help support STEM students.

Another two strengths in the Chemistry Department are the increase in the use of instrumentation, as well as the acquisition of instruments that are essential for students' university and career readiness. This was previously identified as a weakness, but our efforts have transformed it into a strength. The students in Organic Chemistry now utilize GC-MS, FT-IR, Polarimetry, and NMR instruments, giving them a better experience of what they would have in the same course at a 4-year institution. It is important that this equipment be kept well maintenance and in good condition for use by our students. The unique individual instruction provided by staff in the use of this equipment accentuates this experience making it superior to any 4-year institution. Our

students finish this our organic series ready for further study upon transfer, and/or work as a chemist in industry. Preparing our students for work in a high-tech field helps to fulfill the mission of the district, "to help our diverse student population achieve its transfer and/or occupational objectives and to advance the economic growth and global competitiveness of business and industry within our region." This brings our department into alignment with the institution as a whole, which amplifies our success. We have had several students participate in summer research and REUs – one student worked for the environmental consulting firm Dudek as an environmental field technician over the summer and another student was able to present his summer research at the American chemical society meeting this past spring and did research at Cal Tech over the summer before transferring to UCLA.

The institution-set standard is a minimum of 67% for course completion. 3 of of 4 upper division majors courses are meeting or exceeding this standard: Chem002 (67%), Chem012 (75%) and Chem013 (77%). Our overall department average course success rate (54%) is consistent with historical pre-covid averages (there was a bump in the overall success rates in 2020 due to the number of students that took EWs and therefore did not count towards the total). The first in the series classes (Chem001, chem20), which make up a good portion of our enrollment, have lower success rates largely due to poor student preparation prior to COS (see below section). While this does warrant improvement, we have seen much higher success rates among students that can access some sort of support: Students who received AAC service had success rates a modest 2% higher than the average, EOPS students in Chem001 had an 82% success rate vs 53% for non-EOPS, and MESA students success rates were 14% higher than non-MESA students for all chem classes F22/S23. We have worked hard to improve success rates by recruiting, training, and growing leaders who are working in the Math Engineering and Science Achievement (MESA) center. Students who apply for and are accepted into the MESA program are connected to tutoring resources, academic coaching, and professional development, which helps to build a community among cohorts of students. The data shows this, as there is a 39% higher success rates for students in Chem 13, 20% in chem 012, and 19% in Chem 20 who attend MESA versus the students who do not., The higher level organic courses are quite challenging for the students, so it good to see that support increases their success rate. Chem20 is (potentially) the first in the chemistry series here at COS (for students who did not take chemistry in high school) and any support that can improve success is the key to getting students on track for timely graduation and transfer. In addition to this, Julie Rodriguez, Teresa Mendoza, Ryan Froese, Jennifer Verissimo, and Chiara MacPherson are currently guiding students through a student-centered Supplemental Instruction (SI) program for their introductory, general chemistry, and organic chemistry courses. The SI sessions have been widely popular, well attended (46% attendance averaged over all F22 and S23 chemistry courses with SIs) and shown marked improvement when all other variables (that can be controlled) remain constant. In all chemistry courses with SIs, the average retention increases by 14.6%, the success rate increases by 27.4%, and the number of As increases by 10.6% for an overall GPA increase of 0.7 for those who attend SI vs those who do not. In the majors-level courses, attendance tends to be higher and the positive effect bigger. For example, our S23 Chem001 saw an increase in success of 42% for SI attenders and Chem013 S23 a 49% increase. As an addendum, we also find that SI sessions build excellent community in the classrooms, and tend to aid in the formation of study groups.
What improvements are needed?: We need a new full time faculty member to maintain the number and quality of our chemistry classes and improve success rates. Retaining adjuncts has been a particular challenge in the last few years due to a competitive job market and the departure of many adjuncts who had developed and honed their teaching skills at COS for full time positions elsewhere. To maintain our course offerings we have had to hire anyone with minimum qualifications, leading to decreased student success. Data was requested from the research and planning office on success rates for Chem001, based on the instructor status in the previous Chem20 course: adjunct taught vs full time faculty (1-year temporary contract, tenure track, and tenure) (full document attached). Overall, in the past 6 years, 470 chem20 students went on to take Chem001 and received a non-EW grade for an overall pass rate of 53%. (An additional 243 students took chem001 without ever taking chem20 due to a qualifying high school class: they had an overall success rate of 56%, for comparison.) However, when we separate out the chem001 students who had a full time instructor for chem20, the success rate is 59% vs a 42% success rate in chem001 for students that had an adjunct for chem20. (please note that all chem001 classes are taught by full time faculty, so this did not need to be split out). This is a large discrepancy and speaks to the quality and rigor of courses taught by full time vs adjuncts. It could be argued that the adjuncts were teaching a different student population – potentially more night classes and therefore students that would not be expected to do as well. So we split out the success rate in chem001 by the grade received in chem20 by the two types of instructors. For students that earned an A in a full time chem20 classroom, 89% passed chem001 while an A in an adjunct chem20 lead to a 77% pass rate in chem001. For students that earned a B in a full time chem20 classroom, 63% passed chem001 while a B in an adjunct chem20 lead to a 39% pass rate in chem001. And for students that earned a C in a full time chem20 classroom, 33% passed chem001 while a C in an adjunct chem20 lead to a 13% pass rate in chem001. Thus the rigor of adjunct instruction is also suspect, as even students receiving good marks are not being prepared for the next course. Perhaps adjuncts simply do not have the time to devote to promoting student success or to developing their teaching – a situation not likely to change. But with another full time position we could potentially cover more intro chemistry courses with dedicated full time instructors and improve success rates.

With AB705 and 1705, we are seeing students enter our chemistry classes with very poor math skills. This makes doing the basic

algebra, unit conversion, and formula use in intro chemistry particularly challenging for our students. Instructors must balance teaching the course outline material and expending effort to remedy remedial math skills, and this is no doubt contributing to lower success rates. To address this need, Ryan Froese has created a chemistry support course to focus on developing the math skills needed for chemistry to improve student retention and success. However, we will need a new faculty member be able to teach the support course(s) while still meeting student demand for our courses.

We would also like to expose students to potential careers in chemistry. There are many good jobs that our students do not consider because they do not know that they exist or what training is necessary to do them. Anecdotally, a student was surprised that anyone does research in chemistry "Isn't everything known already?". We would like to be able to have them explore what a chemistry researcher does, what a lab scientist does, so that they can consider these career paths. To that end, Jenny started a field trip last year to visit and tour various labs and meet the scientists working there. We would like to grow that trip and make it an annual occurrence. However logistics would be much improved and it would be a better, smoother experience for the students if we were able to transport them in one bus rather than many independent vehicles (which struggled to find parking and meet back up with each other at the various stops). Additionally we would like to be able to provide lunch (perhaps on Fresno's campus). This will require a consistent source of funding.

We have several pieces of excellent equipment that gives students hands-on experience with instrumentation as part of our chemistry lab experience. These are stored in an instrumentation room which is temperature controlled along with the rest of the building. However, when the rest of the building is in off mode (nights, weekends, parts of the summer), the temperature in the room fluctuates and can potentially damage the instruments, require lengthy re-calibration when they are to be used, or delay or invalidate student data collection. We have been told that to control the temperature of that room consistently, the entire buildings HVAC would have to be engaged, which is not a good use of power. We would like to be able to independently control the temperature in the instrumentation room so that is can remain operational even during "off" hours. A mini-split installed to the roof would be able to accomplish this, and should not be overly difficult since the instrument room is on the second floor so the routing should not be difficult.

Describe any external opportunities or challenges.: The biggest challenge facing the department this year is the rapid growth that we are seeing in course demand. This is a wonderful challenge because more students taking Chem 20 means increased enrollment in our majors courses, which we are seeing across the board. We are offering a record-breaking number of Chem 20 (20) courses this semester. Demand for Chem012 this year was incredibly strong, even after a historically greater demand last year. Ultimately we were not able provide a class spot to every student that needed one (including at least one student who will not have the requisite classes for her TAG agreement). Due to limited lab space and safety concerns, the class is limited to 18 students, leaving 10 students on the waitlist. This number has increased in the past couple of years and we anticipate future demand will require multiple sections. Adding this to our current offerings would be supported by the addition of a new full time faculty member.

We strive to improve our success and retention without compromising our standards. We find this most challenging in our Chem 20 courses where we receive many students from local high schools who lack the skills necessary to succeed in a college-level chemistry course. The chemistry department is continually searching for ways to improve success in our Chem 20 courses. In an effort to improve success rates for some of our lower-level students, Ryan Froese wrote a Chem 20 with support course. This course will use an atoms-first approach to allow students to receive the math support they need before approaching it in the chemistry portion of the class. The chemistry department is optimistic that this course will help to support students who historically struggle in chemistry due to insufficient mathematical skills. It is likely that the new faculty member would be teaching at least one section of this class in the future as our course offerings continue to expand.

The chemistry department utilizes technology in an effort to improve both the success rates in and access to our Chem 20 classes. Many students have jobs that make attending class 3-4 times per week impossible. In response to this issue, Teresa Mendoza and Jennifer Verissimo are currently teaching a total of four hybrid Chem 20 courses, where students can watch lectures on their own time and come to school only once a week to attend lab and/or take exams. To increase engagement for online students, Ryan Froese created chemical demonstration videos to give our online students some of the comparable engaging experiences that face-to-face students get. Additionally, the videos were shared with the chemistry department which especially helped to add more engaging experiences for students when classes were moved online in the spring of 2020. Surveys from the courses show the online format has helped to provide more access to students who would otherwise be unable to take the class. Many students had glowing reviews of the format, but many others wrote they struggled to succeed due to time management and their own procrastination. The online format makes this procrastination even more possible than usual and has exhibited lower success rates. Much of these lower success rates can also be explained by an increase in access; the students who can only take the online format also have busy lives that inhibit success. We need to continue to find ways to support these non-traditional students and raise the success rates of our hybrid courses to meet the success rates of our in-person courses.

Supporting student success is more challenging out at the Tulare Center. The tutorial services out at the Tulare Center have improved but are still a significant challenge. We currently have 1 tutor out in Tulare that has very limited hours. I often have to tell students that they can either have a Zoom option for tutoring or they can go to Visalia to receive tutoring at either the library or at the MESA center.

The MESA Center is trying to establish a presence out in Tulare. They opened a Pop-Up out in Tulare last Spring 2023 in Building B right outside of B228. They have a Pop-Up open this semester at the end of the hall in Building B. They are currently trying to find a more permanent location for the center and they are calling it the STEA(g)M program so that even the Ag students can be included. I am looking forward to a more permanent location being established for the progarm so that a community of learners can begin to be established.

The MESA program is a contributor to the success of many STEM majors at COS; however, there is currently only a strong MESA presence on the Visalia campus. As we expand our course offerings, especially the majors courses, to the other campuses, it is vital that the MESA program expands along with it. In the past year, both Chem 1 and Chem 2 were taught on the Tulare campus, but there is not equitable access to the resources and community that there is on the Visalia campus. The addition of a part time instructional specialist would help establish this center and help remedy the lack of tutors availiable on the Tulare campus. For this reason, many students still have to travel to the Visalia campus to receive tutoring and academic coaching, reducing the number of students willing to take classes in Tulare. In addition, for our students living in Pixley, Porterville, and other outer-lying areas, Visalia is a significant drive past Tulare and may not be feasible. Having a satellite MESA center on the Tulare campus would support STEM majors who are taking classes there, support the growth of the Tulare campus as a whole, and help provide access to resources for students in rural communities. If the satellite MESA center on the Tulare campus is successful, the chemistry department would hope to see it expanded to the Hanford campus in the future as the program continues to grow.

We need improved study spaces in the science department. Our students often reside in outlying areas, and commute in. Many of them also have home environments that are not conducive to study, and as such are need spaces in the science building to study in groups and individually. Sometimes they end up sitting in the hallways in between classes, trying to study or do homework on a chair borrowed from a classroom and stay out of the way of through foot traffic. SI sessions have had trouble finding spaces to meet due to high classroom utilization and the low-utilization computer rooms are not conducive to group work. The MESA center expansion has further exacerbated this shortage with quiet study computer room becoming the crowded and loud tutoring room, and the MESA room seemingly underutilized and for MESA students only. Many of our students would benefit from this quiet study space (and from MESA membership in general) but the number of MESA students is capped due to limited number of academic coaches.

Overall SLO Achievement: Our department is still filtering through large changes in the area of SLO's. After previously noting an absence of useful data from SLO's, we determined that the SLO's themselves were the culprits. We collaboratively constructed new SLO's, PLO's, designed new assessment methods and scheduled assessments. We are excited about the new SLO's and PLO's, as they align much better between courses and with the program as a whole. They also create much better goals for student achievement that align more closely with the mission of the district. Instead of a myopic focus on individual paper-based skills, they broaden the scope to conceptual connections, exhibiting deep awareness of the underlying principles of both chemistry and critical thinking. They also broaden the scope of our goals to laboratory-based skills, which prepare the students for their careers. We have some preliminary SLO data, though we still need to get through more cycles for it to gain statistical accuracy.

Preliminary Data: We calculate that Chem 1 and Chem 2 are showing the most promising results with 76.7% and 78.0% respectively as an average SLO achievement for each course. This exceeds our goal (70%) and speaks to the quality of instruction provided in these courses. Chem 12 and 13 showed an average SLO achievement of 63.7% and 69.2% respectively. These numbers were not surprising as these courses are quite challenging regardless of the institution in which they are taught, and our target is set at 60%. However, this is lower than historical averages, as added to the difficulty of the course are the effects of covid learning losses as that cohort of students makes its way through the chemistry program, particularly seen in slightly lower than average chem001 achievement and much lower chem012 success.
The SLOs that did not meet our goals were:
“Mechanisms” for both Chem 12 and Chem 13 and “Synthesis” for Chem013 under the Qualitative Analysis PLO.
“Laboratory” for both Chem 12 and Chem 13 under the Laboratory PLO.
“Laboratory” for Chem 13 under the Quantitative Analysis PLO.
Changes Based on SLO Achievement: Ryan Froese, Jennifer Verissimo, and James Kawagoe are working to format Chem 12 and Chem 13 with more emphasis on higher-order thinking woven into the course’s instruction to improve the SLOs regarding “Mechanism” and “Synthesis.” James has been trying a “flipped” model of instruction focused on improving problem solving

skills and getting students more guided practice. This should bring the average SLOs up to the target range when they are assessed next. We believe that the SLOs that were not met in Chem 12 and 13 were because of the COVID pandemic in 2020 as well as a lack of lab instrumentation. The "Laboratory" SLO for Chem 13 was not met largely due to the cancellation of the lab practical due to COVID in the spring 2020 semester.
We have also included the part-time faculty in the SLO process to some degree (recently for Chem20 and using a common question) and are incorporating their data to develop a more complete image of the department as a whole. We have much growth needed in this area and would like to include adjunct faculty in our SLO data beyond simply incorporating their data.
Overall PLO Achievement: Jennifer Verissimo mapped our course SLO's to our newly created PLO's in the new Chemistry AS-T and Teresa Mendoza tabulated the data. Any course that met the SLO goal we have set was counted as achieved. Our PLO's were as follows:

Quantitative Analysis: 3 SLO's met of 4 SLO's mapped to this PLO.
Qualitative Analysis: 4 SLO's met of 8 SLO's mapped to this PLO.
Laboratory Skills: 3 SLO's met of 4 SLO's mapped to this PLO.
Changes Based on PLO Achievement: From this data, we have begun to discuss the incorporation of more critical thinking in the form of qualitative questioning in the program from the outset. To address the Chem 12/13 "Synthesis" and "Mechanisms" SLOs, we have resumed discussions on how to increase the Brigg's level in previous courses by requiring students to answer more questions involving "Synthesis or Creation". This may better prepare students for the level of this expectation in Chem 12. We predict that the next PLO assessment will improve as we are now back to offering more in person classes after an online stint. We have also considered giving the ACS exam as a final for some of our courses so that we can compare our students' achievements with students across the nation. Finally, would like to further incorporate our adjunct instructors in the SLO discussion process and the workings of our department in general.
Outcome cycle evaluation: This year we have done some major work on our program. We used last year's cycle data to launch some major program overhaul, as well as start discussions of the next steps. The hard work of our department faculty is evident from the following bird's eye view of our changes. We created new SLO's/PLO's to present students with a more cohesive program, and glean more relevant data. From the transformation of our SLO's/PLO's, we realized that Chem 253 was not meeting the needs of our students. We redesigned it to do so and is now known as Chem 10. This was also in response to the qualitative data showing Chem 20 contained many misplaced students, who now benefit from this new course. We also teach a Chem 20 hybrid course to meet the needs of working students, and students who are family caregivers. We are in the process of designing a Chem 20 course with support to mitigate our student's poor mathematical skills and help to increase our overall success rates in the course. We will continue discussions and efforts to increase success in Chem 20. Over the past few years, we have seen the majority of our courses get waitlist-full status shortly after registration has opened. To meet this demand, the chemistry department is offering more chemistry courses than we ever have before. However to sustain the current number of classes, maintain educational quality, meet future demand for higher level courses, as well as offer support courses a new full time faculty member is required. Finally, we have seen excellent results from SI sessions from the limited data that we have but would like to get more data specific to this area. All of these changes take a student-first approach, as the rationale behind each change demonstrates. We have striven to meet the needs of both our students and our community and look forward to continuing to do so.

Action: 2022/2023 - 2021-2022 - (Growth Faculty Position) - Maintain Current Course Offerings in Visalia while Expanding Course Offerings in Tulare

We would like to hire a full time chemistry faculty member in order to maintain our course offerings in Visalia while adding chemistry courses out in Tulare.

Leave Blank:
Implementation Timeline: 2021 - 2022, 2022 - 2023
Leave Blank:
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Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Julie Rodriguez, Ryan Froese
Rationale (With supporting data): All of our chemistry classes fill! At Census, on the Visalia campus, the chemistry department had 106%, 98% and then 102% of the seats filled in 2018-2019, 2019-2020 and 2020-2021, respectively. We currently have 4 adjunct faculty members covering 6 chemistry classes. We just recently lost one of our adjunct faculty members who was teaching two of those classes. For Spring, we will be down 2 classes because of this resignation. Ryan Froese is also teaching large overloads right now and will not be doing so beyond this semester. We will lose at least another 2 classes when he stops

teaching overloads. So, even though this will be a growth position, we need it to maintain our current course offerings. We would also like to move two more of our introductory courses out to the Tulare campus and have this new person teach part of their load on the Tulare campus. This way we will continue to expand the chemistry program on the Tulare campus. The chemistry fill rates on the Tulare campus have been 116%, 115% and 106% in 2018-2019, 2019-2020 and 2020-2021.
Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2023 - 2024 08/18/2023
Status: Action Completed
a faculty member was hired, but for visalia/Hanford
Impact on District Objectives/Unit Outcomes (Not Required):

Update Year: 2022 - 2023 09/09/2022
Status: Continue Action Next Year
We were not given a growth position in the 2021-2022 school year so we will be asking for this position again this year. We currently have a one-year full-time temporary in this position.

At Census, on the Visalia campus, the chemistry department has had an average of 99% of the seats filled during the past four years. Many of the courses that we offer are waitlist-full before normal registration begins. All of our Chem 20 courses are usually full within a couple of weeks and this is causing a bottleneck for our majors program. In addition to full classes and full waitlists, in Chem 20 we observe about 5-7 people per section are trying to “crash” the class on the first day in hopes of enrolling in the course if a registered student drops. For this reason, we have added additional introductory chemistry courses and are now offering a record-breaking 16 Chem 20 courses and 3 Chem 10 courses this fall. We were beginning to see similar trends in our majors courses as well (due to more students taking and passing Chem 20) and have added both a Chem 1 and a Chem 2 this semester to meet student demand. Because enrollment is up in Chem 1 and 2, it is likely that we will need to add additional Chem 12 courses in the future as the program continues to grow. We think it is important to note that unlike other classes, we are unable to add extra students because our laboratory rooms will only hold 24 students. It poses a safety hazard to exceed this number, and we do not have the glassware to do so if we were so inclined. We currently have 5 adjunct faculty members covering 9 chemistry classes. In addition, our temporary full-time faculty member is teaching an overload of 21 units (one Chem 2 course and three Chem 20 courses). If we do not retain this full-time position, we will lose a majors course offering (Chem 2) and significantly decrease the number of Chem 20 courses that we are able to offer. In addition, the added majors course is being offered at night for the first time, which is allowing more non-traditional students to purse a major in the sciences; this aligns with the college’s goal of increasing access to our majors courses for all students. So, even though this will be a growth position, we need another full-time faculty member to maintain our current course offerings and allow for equitable access to our majors courses. We would also like to move two more of our introductory courses out to the Tulare campus and have this new faculty member teach part of their load on the Tulare campus. This way we will continue to expand the chemistry program on the Tulare campus.
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Personnel - Faculty - We would like to hire another full-time Faculty member in Chemistry to maintain our offerings on both the Visalia and the Tulare Campus. (Active)

Why is this resource required for this action?: We are in need of a full-time faculty member in chemistry to maintain our current course offerings on both the Visalia and Tulare Campuses. We cannot seem to offer enough chemistry classes! At Census, on the Visalia campus, the chemistry department has had an average of 99% of the seats filled during the past four years. Many of the courses that we offer are waitlist-full before normal registration begins. All of our Chem 20 courses are usually full within a couple of weeks and this is causing a bottleneck for our majors program. In addition to full classes and full waitlists, in Chem 20 we observe about 5-7 people per section are trying to “crash” the class on the first day in hopes

of enrolling in the course if a registered student drops. For this reason, we have added additional introductory chemistry courses and are now offering a record-breaking 16 Chem 20 courses and 3 Chem 10 courses this fall. We were beginning to see similar trends in our majors courses as well (due to more students taking and passing Chem 20) and have added both a Chem 1 and a Chem 2 this semester to meet student demand. Because enrollment is up in Chem 1 and 2, it is likely that we will need to add additional Chem 12 courses in the future as the program continues to grow. We think it is important to note that unlike other classes, we are unable to add extra students because our laboratory rooms will only hold 24 students. It poses a safety hazard to exceed this number, and we do not have the glassware to do so if we were so inclined. We currently have 5 adjunct faculty members covering 9 chemistry classes. In addition, our temporary full-time faculty member is teaching an overload of 21 units (one Chem 2 course and three Chem 20 courses). If we do not retain this full-time position, we will lose a majors course offering (Chem 2) and significantly decrease the number of Chem 20 courses that we are able to offer. In addition, the added majors course is being offered at night for the first time, which is allowing more non-traditional students to purse a major in the sciences; this aligns with the college's goal of increasing access to our majors courses for all students. So, even though this will be a growth position, we need another full-time faculty member to maintain our current course offerings and allow for equitable access to our majors courses. We would also like to move two more of our introductory courses out to the Tulare campus and have this new faculty member teach part of their load on the Tulare campus. This way we will continue to expand the chemistry program on the Tulare campus.

Notes (optional):

Cost of Request (Nothing will be funded over the amount listed.): 125000

Related Documents:

CHEM 2021 Program Review Data.pdf
Faculty Growth F21 Program Review.pdf
CHEM 2022 Program Review Data.pdf

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2022/2023 - Equipment for Expanded Enrollment

We would like to purchase new equipment to accommodate our expanded enrollment.

Leave Blank:

Implementation Timeline: 2022 - 2023

Leave Blank:

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Identify related course/program outcomes:

Person(s) Responsible (Name and Position): Ryan Froese, Andrea Smith, Chemistry Faculty

Rationale (With supporting data):

Priority: High

Safety Issue: Yes

External Mandate: No

Program Review - Chemistry

Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2023 - 2024 08/11/2023
Status: Action Completed
Equipment was purchased
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Equipment - Instructional - We would like to purchase: New Heating Mantels, Centigram Balances, Hot Plates with Stirrers and Burets (Active)

Why is this resource required for this action?: We are seeking funds for new equipment for use in our chemistry labs. Due to the increase in the number of courses being offered and in the number of students that are passing through our program, we have more chemistry students than we have ever had in the history of COS. This means that our equipment is being used more frequently and needs to be replaced when it begins to function improperly. We are requesting new heating mantles, centigram balances (including installation and calibration), hot plates with stirrers, and burets to replace broken equipment and to accommodate the additional students that we are serving.

Notes (optional):

Cost of Request (Nothing will be funded over the amount listed.): 28000

Related Documents:
Program Review Quotes 2022-2023.pdf

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2022/2023 - Base Budget Augmentation - Chemistry

We would like to ask for an increase in our base budget in order to support our expanded enrollment.

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Ryan Froese, Francisco Banuelos
Rationale (With supporting data):
Priority: High
Safety Issue: No
External Mandate: No

Program Review - Chemistry

Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2023 - 2024 08/18/2023
Status: Action Completed
Budget was augmented
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Adjustment to Base Budget - Chemistry needs a base budget augmentation in order to cover the additional costs of expanding enrollments and the increased cost of supplies. We now have more students taking chemistry and inflation has driven up our cost of purchasing our supplies. We have also had to increase our PPE supplies because more students now are wanting to wear gloves in lab. (Active)

Why is this resource required for this action?:
Notes (optional): Our current budget is $9400 and we would like an increase of $3500.
Cost of Request (Nothing will be funded over the amount listed.): 3500

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2022/2023 – New Chairs for John Muir Labs

We are requesting funds for new laboratory chairs for use in the science labs of the John Muir building. The current chairs are quite old and many do not roll or function as well as they previously did. We would like to replace our current laboratory chairs with chairs that have roller casters on all feet of the chairs.

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Science Division
Rationale (With supporting data):
Priority: Low
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Program Review - Chemistry

Update on Action

Updates

Update Year: 2023 - 2024 08/11/2023
Status: Action Completed
Worst chairs were replaced in 220 and 221, all were replaced in 219
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Equipment - Instructional - We are requesting funds for 90 new laboratory chairs for use in the science labs of the John Muir building. (Active)
Why is this resource required for this action?: The current chairs are quite old and many do not roll or function as well as they previously did. We would like to replace our current laboratory chairs with chairs that have roller casters on all feet of the chairs.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 76500

Link Actions to District Objectives

District Objectives: 2018-2021

District Objective 4.3 - College of the Sequoias Board of Trustees, administration, faculty, and staff will engage in best practices and staff development to sustain effective operational systems for institutional assessment and continuous improvement.

District Objectives: 2021-2025

District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.

District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.

District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2022/2023 - Expand Tutorial Services in Tulare

We are currently struggling to find tutors in Tulare. So, we would like to either hire MESA tutors to come out to the Tulare Center or do a better job at recruiting Chemistry tutors.

Leave Blank:
Implementation Timeline: 2022 - 2023
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Julie Rodriguez
Rationale (With supporting data):
Priority: High
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Update on Action

Updates

Update Year: 2023 - 2024 09/07/2023

Program Review - Chemistry

Status: Continue Action Next Year
while there is a presence, often the only available option is virtual rather than in person. This action continues
Impact on District Objectives/Unit Outcomes (Not Required):

Resources Description

Personnel - Classified/Confidential - The Tulare Center needs Chemistry tutors. I currently do not have any tutors for Chemistry at the Tulare Center. My students have to drive to Visalia to receive tutorial services. (Active)
Why is this resource required for this action?:
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.):

Link Actions to District Objectives

District Objectives: 2018-2021
District Objective 1.1 - The District will increase FTES by 1.75% over the three years
District Objective 2.1 - Increase the percentage of students who earn an associate degree or certificate (CTE and Non-CTE) by 5 percentage points over three years
District Objective 2.2 - Increase the number of students who transfer to a four-year institution by 10 percent over three years

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2023/2024 Building accessibility

Retrofit the John Muir hallways doors to be more accessible for people in wheelchairs and with canes

Leave Blank:
Implementation Timeline: 2023 - 2024
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Francisco Banuelos - Dean SME, Byron Woods -Dean of facilities
Rationale (With supporting data): The doors to John Muir hallways are too hard to open. People in wheelchairs and those with limited mobility (walking with a cane or crutches) regularly have difficulty opening them. They have been observed to partially close on an individual partway through which is a safety concern. They also could present a hazard in quickly exiting the building in the even of an emergency for a person with limited mobility.
Priority: Medium
Safety Issue: Yes
External Mandate: No
Safety/Mandate Explanation: needs to be ADA compliant

Resources Description

Facilities - Doors to John Muir hallways need to be equipped with electronic opening mechanisms (Active)
Why is this resource required for this action?: To make the doors accessible
Notes (optional): There are 8 doors, quote of 15,000 each
Cost of Request (Nothing will be funded over the amount listed.): 120000

Program Review - Chemistry

Related Documents:
Quote for accessible JM doors.pdf

Link Actions to District Objectives

District Objectives: 2018-2021

District Objective 4.3 - College of the Sequoias Board of Trustees, administration, faculty, and staff will engage in best practices and staff development to sustain effective operational systems for institutional assessment and continuous improvement.

District Objectives: 2021-2025

District Objective 4.3 - Improve professional development practices District-wide for all District employees to support equity and operational effectiveness from 2021-2025.

Action: 2023/2024 (Growth faculty position) New faculty position for increased enrollment

We would like to hire a new chemistry full time instructor in order to continue to offer enough classes to meet the student need, to offer support courses to help students with insufficient math skills due to AB705, and improve overall success rates by having a dedicated instructor rather than relying on lower success rate adjuncts.

Leave Blank:
Implementation Timeline: 2023 - 2024
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Francisco Banuelos
Rationale (With supporting data): We are currently offering more classes than we ever had before in order to meet student demand. However, in order to do so, we have had to rely on an unstable adjunct pool. Data from the research and planning office shows that success in adjunct-taught classes vs full time have lower success rates and leave students less prepared to continue in the next class in the series.
We also are not currently meeting demand for higher level organic classes, having to turn students away and making so that they do not make their TAG agreements or have to look elsewhere to get the classes they need. So further expansion is still needed.
Additionally, due to AB705, we are seeing students attempt to take intro chemistry without the necessary math skills. We need to implement a support course to catch these students up on these skills before they encounter then in the chemistry course. However, offering support courses to increase student success will require more faculty to help teach them.

Priority: Medium
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Personnel - Faculty - Full time Chemistry instructor (Active)
Why is this resource required for this action?: To continue to offer enough classes to meet the student need, to offer support courses to help students with insufficient math skills due to AB705, and improve overall success rates by having a dedicated instructor rather than relying on lower success rate adjuncts
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 125000
Related Documents:
CHEM 001 by CHEM 020 data request.pdf

Link Actions to District Objectives

Program Review - Chemistry

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2023/2024 Chemistry careers field trip (future years funding establish)

Conduct a 1 day field trip once a year to visit commercial and academic labs in the area to expose students to possible careers in chemistry

Leave Blank:
Implementation Timeline: 2023 - 2024
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Jennifer Verissimo
Rationale (With supporting data):
Priority: Low
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Adjustment to Base Budget - Funding for a field trip to multiple locations for students to meet people working in the filed of chemistry - both in academic research and in industry. Funding for bus for trip and to provide lunch. (Active)
Why is this resource required for this action?: To increase the number of students considering careers in chemistry and to envision what they can do with their degree after graduation. Taking one vehicle would enable a smoother trip process and allow more sites to be visited than multiple vehicles. Providing lunch would allow us to keep the group together over the day rather than lose part of the group at lunch time.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 4000

Link Actions to District Objectives

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2023/2024 Temperature control in instrument room

Install an independent cooling apparatus for the chemistry instrument room so that temperature control can be maintained when the building is off and the instruments are not damaged or require lengthy recalibration

Leave Blank:
Implementation Timeline: 2023 - 2024
Leave Blank:
Leave Blank:

Program Review - Chemistry

Identify related course/program outcomes:
Person(s) Responsible (Name and Position): James Kawagoe - Professor / Byron Woods
Rationale (With supporting data): When the rest of the building is in off mode (nights, weekends, parts of the summer), the temperature in the room fluctuates and can potentially damage the instruments, require lengthy re-calibration when they are to be used, or delay or invalidate student data collection. We have been told that to control the temperature of that room consistently, half of the building's HVAC would have to be engaged, which is not an option during off hours. We would like to be able to independently control the temperature in the instrumentation room so that is can remain operational even during “off” hours. A mini-split installed to the roof would be able to accomplish this, and should not be overly difficult since the instrument room is on the second floor so the routing is feasible. Byron estimates this can be done for $25,000.
Priority: Medium
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Facilities - A mini-split cooling system to temperature control the instrument room (Active)
Why is this resource required for this action?: When the rest of the building is in off mode (nights, weekends, parts of the summer), the temperature in the room fluctuates and can potentially damage the instruments, require lengthy re-calibration when they are to be used, or delay or invalidate student data collection. We have been told that to control the temperature of that room consistently, half of the building's HVAC would have to be engaged, which is not an option during off hours. We would like to be able to independently control the temperature in the instrumentation room so that is can remain operational even during “off” hours. A mini-split installed to the roof would be able to accomplish this, and should not be overly difficult since the instrument room is on the second floor so the routing is feasible.
Notes (optional):
Cost of Request (Nothing will be funded over the amount listed.): 25000
Related Documents:
Quote for minisplit for JM215 temp control.pdf

Link Actions to District Objectives

District Objectives: 2021-2025
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2023/2024 Marginal cost of labs estimation for improved planning

Work with lab tech to estimate the cost of running each lab section for each type of class, to ensure a sufficient budget exists to expand offerings.

Leave Blank:
Implementation Timeline: 2023 - 2024
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Andrea Smith - Labratory technician
Rationale (With supporting data): Right now we have high demand for Chem012 and need to expand to have two sections and need to ensure we can purchase enough lab materials. We also have increases the number of chem20's running and need to ensure that support for them is sustained (right now we are running on surpluses from the pandemic, but eventually will need to purchase new materials.
Priority: Medium
Safety Issue: No

Program Review - Chemistry

External Mandate: No
Safety/Mandate Explanation:

Link Actions to District Objectives

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 4.1 - Increase the effective use of data and transparency in decision making at all institutional levels from 2021-2025.

Action: 2023/2024 Improved onboarding of Adjunct instructors

Create a better process for incorporating new adjunct instructors so that expectations of course content are communicated, resources are shared, and lab best practices are transmitted. This will include making a packet that expands on the course outline, a sample syllabus, useful worksheets, and memorize lists. It will also include collaboration with the chemistry lab tech on typical lab modifications to help labs work better.

Leave Blank:
Implementation Timeline: 2023 - 2024
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Chiara MacPherson - Professor, Andrea Smith - Lab technician
Rationale (With supporting data): Data shows that students who take chem20 from adjuncts go on to do worse in chem001 than students who took chem20 with a full time instructor. We need to help support our adjunct instructors to improve the quality of their classes.
Priority: Medium
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Link Actions to District Objectives

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.
District Objective 4.2 - Improve communication practices needed to support organizational effectiveness and continuous improvement across all District units and constituents from 2021-2025.

Action: 2023/2024 Chemistry careers field trip_(this year)

Conduct a 1 day field trip to visit commercial and academic labs in the area to expose students to possible careers in chemistry this year

Leave Blank:
Implementation Timeline: 2023 - 2024

Program Review - Chemistry

Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Jennifer Verissimo
Rationale (With supporting data):
Priority: Low
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Equipment - Instructional - Funding for a field trip to multiple locations for students to meet people working in the filed of chemistry - both in academic research and in industry. Funding for bus for trip and to provide lunch. (Active)

Why is this resource required for this action?: To increase the number of students considering careers in chemistry and to envision what they can do with their degree after graduation. Taking one vehicle would enable a smoother trip process and allow more sites to be visited than multiple vehicles. Providing lunch would allow us to keep the group together over the day rather than lose part of the group at lunch time.

Notes (optional):

Cost of Request (Nothing will be funded over the amount listed.): 4000

Link Actions to District Objectives

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.

Action: 2023/2024 Senior Instructional Specialist for Tulare MESA

Hire a part-time (24 hours/week, 10 month) Senior Instructional Specialist (classified position) to support STEAgM at the Tulare center

Leave Blank:
Implementation Timeline: 2023 - 2024
Leave Blank:
Leave Blank:
Identify related course/program outcomes:
Person(s) Responsible (Name and Position): Tess Hernandez - MESA director
Rationale (With supporting data): help with 1)trying to find tutors, which is very difficult out there for STEM. 2) a near-peer mentor for students to connect with if they need help with their classes or finding/using resources.
Priority: Medium
Safety Issue: No
External Mandate: No
Safety/Mandate Explanation:

Resources Description

Personnel - Classified/Confidential - Hire a part-time (24 hours/week, 10 month) Senior Instructional Specialist (classified position) to support STEAgM at the Tulare center (Active)

Why is this resource required for this action?: Need a MESA presence at the Tulare center. Establishing this position would help with 1)trying to find tutors, which is very difficult out there for STEM. 2) a near-peer mentor for students to connect with if they need help with their classes or finding/using resources.

Notes (optional):

Program Review - Chemistry

Cost of Request (Nothing will be funded over the amount listed.): 45000

Link Actions to District Objectives

District Objectives: 2021-2025
District Objective 1.1 - The District will increase FTES 2% from 2021 to 2025.
District Objective 2.1 - Increase the number of students who earn an associate degree or certificate (CTE and non-CTE) by 5% from 2021-2025.
District Objective 2.2 - Increase the number of students who are transfer-ready by 15% and students who transfer to four-year institutions by 10% from 2021-2025.
District Objective 3.1 - Reduce equity gaps in course success rates across all departments by 40% from 2021-2025.
District Objective 4.2 - Improve communication practices needed to support organizational effectiveness and continuous improvement across all District units and constituents from 2021-2025.