Contents

Instructional Program Review

General Information

1. Name of department (program) under review.

   Chemistry

2. Who is the person(s) submitting the Program Review form?

   Colin Thomas and Dan Gretch

3. What is the current academic year (i.e. 2022-23)?

   2022-23

4. Please describe the department/program, its staff and faculty, etc.

   The chemistry course offerings are supported by three employees: Instructors Dr. Dan Gretch and Dr. Colin Thomas plus an Instructional Support Specialist Michael Baldwin. The program offers 12 transferrable courses and no non-transferrable courses. In this academic year all courses have become ZTC designated through OER resources or through free textbook initiatives made available by the college.

5. Please describe how this department's/program's mission relates to the college's mission and strategic goals.

   Discovery is possibly the most central tenet of science, and the chemistry program is designed to present students with many opportunities for discovery. From the demonstrations in which Dr. Gretch makes water boil by cooling with ice to the self-design chemical syntheses in Dr. Thomas's organic lab, opportunities for discovery are presented and leveraged to encourage students to become inquisitive and thoughtful life-long learners. Of course, the program is designed to afford an AS-T in chemistry for those choosing to pursue a chemistry pathway; regardless, all staff in the program contribute to a positive learning environment which respects student's health and wellness. Using assessments like this one, the ACS standardized national chemistry examination for organic chemistry, and course assessments of CSLOs a culture of assessment and improvement exists within the program. Some plans for improvement are included later in this review.

Department Data Sheet

1. Review the Department Summary Data Table. What are the strengths? What are the challenges or areas of improvement? What is the impact on students? Respond to a minimum of three trends such as census enrollment, FTES/FTEF, course success rate, course retention rate, etc.

Census enrollment has crashed, along with college enrollment. However, the chemistry program has adjusted the number of course sections to keep the number of FTEFs in proportion. Some of this change in FTEFs is due to CT taking reassigned time to participate in the College's accreditation cycle, but the downsizing of summer offerings, reducing the number of sections of labs associated with an introductory course, and discontinuing use of part-time faculty have also decreased FTEFs. Unfortunately, many of the sections that were eliminated had some of the highest fill-rates, so the trend in section fill rate has declined in part due to these changes.
The productivity ratio for the program is well below the institutional target, but the chemistry program, due to YFA agreed upon limitations on class capacity, could never reach the institutional target for FTES/FTEF of 14.
The number of students declaring chemistry as an award program remains acceptable, even considering the disruptions to the school in 20-21, though the number of awards granted lags significantly behind.

2. Review the Department Student Equity – Success Rates Data Table. What are the strengths? What are the challenges or areas of improvement? What is the impact on students?

The chemistry program does not observe many DIs due to masking thresholds for many student demographic groupings, but the three DIs demarcated are commented on here. The success rate gap for students aged 18-24 is approx. 10% below that of the average of all students' performance. This age group is by far the largest age group, and when one considers that that average course success rate for all students is 76.7%, the success rate gap for 18 to 24 decreases to –5.1%. While it is tempting to conclude that there may be something systemic reducing success rates for this population, it can also be concluded that the other age groups are being supported to increase their success rates over that of the traditionally aged students in the cohort. However, the same rose-lensed analysis cannot be applied to the DI observed for Hispanic students. This data shows creativity and effort for this subcategory of students is required to improve success rates.
The third DI category is for female students which shows a –3.3% success rate gap. My interpretation is that this gap, being based upon three years of data—one of which is incomplete, is too small to be interpreted as a DI. However, this DI will be tracked over time to see if the gap increases or persists. Of note, even though the success rate of females lags that of males, the overall number of females succeeding chemistry courses is 1.5 times the number of males. Alternatively, if one uses the overall success of all students as the denominator, the success rate gap of females decreases to -1.1%.

3. Review the Program (Department) SLO Data Table. How does your department support ISLOs? What are the strengths and challenges? What is the impact on the college mission?

The chemistry program has been intentional about SLO assessments, sharing the means by which each CSLO is evaluated. Although the exact assessment is not the same for each instructor, the method by which the assessments are determined is identical. We believe this gives more fidelity to the CSLO assessment data, and therefore can draw more meaningful conclusions.

Four of the six ISLOs are supported by CSLO analyses in the chemistry program, and none rise to the level of concern that the department is not fulfilling its role in serving the mission of the college. Indeed, the rate of meeting or exceeding expectations of the four ISLOs exceeds the overall course success rate. One interpretation could be that even though some students are not passing the course, those students are showing evidence of success at some of the CSLOs. Other interpretations are possible.

Award Data Sheet

1. Review both tables on the Award Data Sheet. What are the strengths? What are the challenges or areas of improvement? What is the impact on students?

There seems to be no bottle-neck classes hindering the successful completion of the AS-T in chemistry. The high GPA of those who finish, and the externally verified rigor of one class (Chem 4B) in the path to the award, indicate that those who participate in this program are performing well. The program faculty would like to see more AS-T in chemistry awards granted, and we are investigating other barriers such as GE courses and recruitment efforts.

Course Data Sheet

1. Review the Course Summary Data Table for each course. What are the trends for enrollment, retention, and success rates? What are the strengths? What are the challenges or areas of improvement? What is the impact on students?

Success rates in first-semester general chemistry (2A) hover around 65 – 70%, and this may lead to lower enrollment numbers in second-semester (2B). However, success rates increase for 2B to over 80%. This trend is continued through the organic chemistry series with success rates increasing to over 97%. The lowest success rates are seen in our two introductory courses: Chem 5 Intro – Environmental Emphasis and Chem 14 Intro - Allied Health Emphasis, with 7-year averages of 65.4% and 72.4%, respectively. As these courses tend to have the largest enrollments in our program, this data suggests that additional support is warranted to help students succeed in these courses. All laboratory sections shows success rates lag minimally behind retention rates and retention rates in lab mostly mirror those of the associated lecture section, so efforts to improve success in the lab courses would likely follow improved success rates in the lecture sections.

2. Review the Student Learning Outcomes Data Table for each course. What are the strengths and challenges? What is the impact on the college mission?

Course CSLO data reflect a similar trend as seen at the program/ISLO level in that students that meet or exceed the CSLO expectation are often greater than the course success rate indicating that even student who not pass the course are displaying success at some of the learning outcomes.

1. What courses and awards are due for 5-year review? To find this information, go to the Curriculum Committee webpage and click on the following links in the left menu bar: Course 5 Year Review Tracker link and Award 5 Year Review Tracker link.

All curriculum processes are current for the chemistry department.

Goal Setting

On the following pages, please establish goals for your department. Keep in mind the purpose of the Program Review to drive continuous improvement, as well as to help establish a need for funding or other support to achieve improved outcomes. **What sorts of things will the department be doing, or would like to be doing, to maintain, expand, or improve excellent instructional delivery?**

This template has space to establish up to three goals. If you wish to add more goals, additional forms are available in the Teams folder.

Goal 1

1. State the status of this goal (new, in-progress, or completed):

   New goal.

2. State this goal is one or two sentences?

   Improved experiential learning in Chem 5/5L Introductory Chemistry: Environmental Emphasis.

3. What is a short name for this goal?

   Environmental Chemistry equipment.

4. In what ways will achieving the goal support the college's mission and/or core values?

   Progress on this goal will enhance academic excellence, transformational learning and growth, civic awareness, and hopefully environmental sustainability. These core values all support the college's mission of "opportunities for discovery and success" and providing an "engaging learning environment."

5. List the college-wide strategic goals that will be addressed by this goal (include all that apply and remove any that do not apply).

   - Increase award completion
   - Increase transfer readiness

6. What steps are you going to take to achieve this goal?

   Creating lecture and laboratory curriculum materials that emphasize hands-on learning and creating new opportunities for students to engage with our campus' physical environment (e.g. pond, forest, soils, atmosphere) will increase the emphasis of this course and provide better links between chemistry and the environment.
   Steps to be taken:
   1 – Curriculum materials created
   2 – Purchase or enhance laboratory equipment for use in Chem 5L

7. How are you going to measure completion of this goal?

   This goal will be completed when the new learning experiences are used in the Chem 5/5L series.

8. If this goal was completed or is in progress, please provide an update and summarize efforts.

   N/A

9. Briefly describe or list the types of resources (staffing, equipment, technology, facilities, etc.) that are needed to support and achieve this goal. Then enter all resource requests through the Resource Allocation Requests link below.

Laboratory equipment which could include instrumentation, consumables and supplies, new sensors for existing equipment, and/or glassware and other hardware.

Resource Allocation Requests

- Enter requests in the Program Review Resource Allocations Request From (Secured – YCCD Login Required) located on the Program Review webpage under the Resource Allocation Requests heading.

Goal 2

1. State the status of this goal (new, in-progress, or completed):

2. State this goal is one or two sentences?

3. What is a short name for this goal?

4. In what ways will achieving the goal support the college's mission and/or core values?

5. List the college-wide strategic goals that will be addressed by this goal (include all that apply and remove any that do not apply).
   - Increase award completion
   - Reduce barriers to completion
   - Reduce equity gaps
   - Increase transfer readiness
   - Increase workforce readiness
   - Maintain institutional stability

6. What steps are you going to take to achieve this goal?

7. How are you going to measure completion of this goal?

8. If this goal was completed or is in progress, please provide an update and summarize efforts.

9. Briefly describe or list the types of resources (staffing, equipment, technology, facilities, etc.) that are needed to support and achieve this goal. Then enter all resource requests through the Resource Allocation Requests link below.

Resource Allocation Requests

- Enter requests in the Program Review Resource Allocations Request From (Secured – YCCD Login Required) located on the Program Review webpage under the Resource Allocation Requests heading.

Goal 3

1. State the status of this goal (new, in-progress, or completed):

2. State this goal is one or two sentences?

3. What is a short name for this goal?

4. In what ways will achieving the goal support the college's mission and/or core values?

5. List the college-wide strategic goals that will be addressed by this goal (include all that apply and remove any that do not apply).
   - Increase award completion
   - Reduce barriers to completion
   - Reduce equity gaps
   - Increase transfer readiness
   - Increase workforce readiness
   - Maintain institutional stability

6. What steps are you going to take to achieve this goal?

7. How are you going to measure completion of this goal?

8. If this goal was completed or is in progress, please provide an update and summarize efforts.

9. Briefly describe or list the types of resources (staffing, equipment, technology, facilities, etc.) that are needed to support and achieve this goal. Then enter all resource requests through the Resource Allocation Requests link below.

Resource Allocation Requests

- Enter requests in the Program Review Resource Allocations Request From (Secured – YCCD Login Required) located on the Program Review webpage under the Resource Allocation Requests heading.

Submit

- When you have completed all areas of the Program Review as outlined above, notify your dean by typing the @ symbol and your dean's name in the box below (e.g. @Sean Osborn, @Steve Amador, etc.).

@Sean Osborn
@Jeri Pourchot

Dean's Review and Feedback

Deans: Please review the form above and place any thoughts or feedback that you have in the space below. Feedback from AAC, counseling, industry, etc. can be included. When completed, please put the @ symbol and the faculty member name(s) at the end so that they will get notified when your review is completed.

Chemistry remains a strong program on campus despite a slight decrease in numbers. As mentioned above this decrease is related to COVID and the temporary reassignment of Colin Thomas' duties because of accreditation. There is room for growth in the program and as a foundational science class it is anticipated this will remain a strong program at Columbia College. Since the program is equipment heavy, it will be important to keep a close check on equipment needs and replace/increase the equipment as needed.