



SEATTLE CENTRAL COLLEGE

One of the Seattle Colleges

CHEMISTRY Program Review Committee Curriculum Coordinating Council

Date of Review: October 29, 2018

Faculty representing the program: Chelsia Berry (associate dean), Marie Villarba, Doug Wick, Nazanin Ruppender, Christian Kinlin (lab technician/manager)

Faculty representing the committee: Alyssa Jocson Porter (review chair), Stani Meredith, Marina Halverson

Next scheduled review: Winter 2023

Narrative:

The Chemistry program, under the STEM-B Division, offers courses supporting the curriculum needs of STEM transfer students (CHEM 139, 161, 162, 163) and Allied Health students (CHEM 121 and CHEM 122). CHEM 241, 242, 243, 251, & 252 also apply to transfer as well as CHEM 110 for those students needing a lab science for the AA but not majoring in STEM yet still transferring. The program has four full-time faculty (FTF): Doug Wick, Marie Villarba, Esmaeel Naeemi, and newly hired Nazanin Ruppender. The program also has four priority-hire part-time faculty (PTF), three PTF, and lab technician/manager Christian Kinlin.

Updates from items in 2014 review

A Chemistry Learning Support Network (LSN) was managed for three to four years wherein faculty held some of their office hours in an open chemistry lab. A drop in student attendance coincided with a decrease in available lab space so this model became impractical and faculty have returned to holding office hours in their offices. Erin Gibbons (PTF) became coordinator of the SAM LSN, and drop-in chemistry tutoring is now available in SAM's first floor tutoring center.

The lab space has improved in safety and technology. Storage room ventilation issues were resolved when the Environmental Health & Safety Manager determined that lab doors must be kept closed at all times in order for the building's ventilation to function properly. One hood in SAM 402 still has intermittent ventilation/airflow issues and is currently being addressed by facilities. Fire retardant discharge has not been an issue since the 2014 review. As for lab technology, old computers have been replaced by Chromebooks which are meeting student needs. The Chromebooks serve as an interface for Vernier systems and can be used to access any Web-based site, such as ALEKS or Canvas. A disadvantage is that the online version of Microsoft Excel cannot create a linear regression trendline when students graph lab data, so they must use their own personal laptops, the instructor station, computer lab, etc. to analyze data.

The content of SCI 131 was very similar to content of CHEM 110 but designed for students pursuing the AA emphasis in Elementary Education. The emphasis required students to take three science courses, but students often chose not to take foundational courses like chemistry, biology, and physics. The SCI 131, 132, and 133 courses were developed collaboratively by science faculty with a focus in CHEM, BIOL, & PHYS to give students a well-rounded science background while modeling how to teach elementary science students. Since the emphasis was phased out, the courses are no longer offered.

Safety

Environmental Health & Safety (EHS) Manager was a valuable resource for the program and faculty and staff are concerned that a replacement has not been hired after former EHS Manager, Krystal Nash, left the college. Nash was employed for approximately two years before leaving the college in March 2018. Elimination of the EHS manager is concerning because it means less frequent safety checks and the absence of valuable troubleshooting (i.e. SAM building ventilation issue). Nash also initiated the process of installing lab lock down buttons--one button in the prep area locks all lab doors.

A long-time chemistry lab technician stored hazardous and potentially explosive chemicals in storage and student spaces. Since that technician's departure in 2015, the chemicals have been safely removed. The current lab technician (Kinlin) inspects labs and chemical storage areas on a regular basis to remain familiar with the current inventory. He has reevaluated purchasing practices and made changes where appropriate; for example, buying smaller quantities of chemicals on an as-needed basis and helping faculty convert some experiments to microscale (e.g. Kinetics in CHEM 162).

CHEM 110 vs 121

Both CHEM 110 and CHEM 121 courses can be taken by non-majors, but CHEM 121 is designed for Allied Health students (although students sometimes think it is for anyone who is pursuing a STEM degree). Student success seems to be related to students' math background. If students have a strong math background, they can succeed in either course. Faculty clearly state the purpose of CHEM 121 on their syllabi to eliminate student confusion and ensure that students are enrolled in the class that will meet their needs. In the future, faculty might consider further differentiation of the courses by turning CHEM 110 into a topics course, i.e. chemistry of climate change or chemistry of food.

Progress since last review - Master Course Outlines

The single recommendation from the 2014 program review was to continue to update master course outlines. Chemistry faculty have collaborated with chemistry faculty at North & South to agree on topical outlines for MCOs. For series like CHEM 161, 162, 163, faculty have agreed on topics that will be included in the series but have different preferences for the order of topics within the series. Therefore, Chemistry faculty recommend that students complete the entire series at one institution.

Although progress on MCOs has been made, there have been significant barriers to progress. First, Central faculty have been unable to submit information for college supplemental documents because faculty at North have been working on them, thereby blocking access by the other two colleges. CHEM 162 and 163 are currently in review for North so Central faculty will soon be able to submit college supplemental info, including course learning outcomes (CLOs) which were reviewed by the Instructional Assessment Committee during the Fall 2017 review. Second, as a transfer program, Chemistry's Program Learning Outcomes are the AS degree outcomes. Faculty have already aligned their CLOs with the proposed AS degree learning outcomes, which have been finalized by the district-wide Common AS Degree Committee but still require final approval at each of the colleges. Chemistry faculty were active on the Common AS Degree Committee that was revising the AS degrees across the district, including updating the learning outcomes, but that committee had stalled in January 2018. Third, from 2015 - 2018, Chemistry faculty invested significant time in hiring a new tenure-track faculty member. Ruppender was hired in June 2018, but the search began in Fall 2015. This lengthy search process included a failed search in 2016 - 2017, unexplained delays in getting positions posted, and implementation of new approval processes by the Chancellor's cabinet.

Course Outline Table

Some entries in the Course Outline table needed clarification or updating.

- CHEM 131 is not offered at Central although it might be developed and offered in the future for allied health students.
- CHEM 123 has not been offered for ~13 years.
- CHEM 191 and 192, 211, 221 are old and no longer offered and should be removed from the catalog.
- CHEM 299 and 298 are offered for a couple students each year.

Attrition & Success Rates

Faculty are interested in identifying and addressing barriers to student success. They question whether appropriate pre-requisites are currently assigned to courses. For example, are MATH pre-requisites high enough? CHEM 139 is designed to prepare students for the general Chemistry series (161, 162, 163), but the learning curve between 139 and 161 is still significant and students may not be adequately prepared for it. Should students be required to achieve a higher grade in 139 to increase their odds of success in 161? Are students waiting too long to enroll in 161 after completing 139? Should the content of CHEM 139 be modified to include more critical thinking and quantitative reasoning? Faculty are interested in looking for correlations between student success in Math courses and their performance in CHEM 139, 161, 162, 163. For example, if a student gets at least a 3.0 versus a 2.0 in MATH 141 before enrolling in CHEM 161, are they more likely to succeed in CHEM 161? Are they more likely to succeed if they get at least 2.5 in MATH 142 or a 2.0 in MATH 151? Would a sliding scale in the Math prerequisite be more effective in ensuring students have the necessary math background to be successful in their CHEM course?

Chemists are aware of a collaboration between Institutional Research and IT at Pierce College which resulted in faculty gaining access to the SBCTC Tableau data dashboard. Faculty would like a similar option at Central so they can set up their own data queries rather than request data from the Office of Institutional Research, especially given the delays in getting data the faculty have requested from IR.

Faculty would like a way to track alumni to follow their students' successes. There was a suggestion that STARFISH might be able to help with this.

ALEKS (Assessment and LEarning Knowledge Spaces)

After reviewing several inadequate online homework systems, faculty have adopted the ALEKS adaptive mastery system for CHEM 121, 139, 161, and 162 (coming soon to 163). Faculty select appropriate topics, objectives, and due dates for each course, and ALEKS requires students to complete an Initial Knowledge Check to assess their current mastery of the topics covered in the course. Afterwards, ALEKS only requires students to complete problems related to those topics on which they have not yet demonstrated mastery. The system works best if students engage with it frequently and consistently. Chemistry faculty have also begun considering using ALEKS to replace the CHEM 161 placement exam, similar to Math's use of ALEKS for Math Placement.

Enrollment

Chemistry faculty noted that their number of course offerings have increased, including more sections of certain classes at night and during summer, but classes are not filling as completely. Faculty have also noticed the decrease in enrollment of international students.

Faculty have questions about data used to generate viability reports. Answers in italics were provided by Dean Rockhill.

- Which enrollment numbers are used? They seem to differ slightly from data in the 10th day enrollment reports that are available in public folders. *End of the quarter enrollment numbers were used.*

- How are student: faculty ratios calculated? Would headcount: section be a more appropriate way of measuring? *This is calculated by the overall headcount of students/number of faculty sections.*
- Where does the “Cost” in Cost/FTE come from? Does lab fee and tech fee factor in? How are costs calculated for lab science courses versus, for example, professional technical programs? *The cost is calculated only from faculty salaries.*
- Why have these one-page summary charts replaced the detailed data (including annual data per course for FTE-Student, Headcount, FTE-Faculty, GPA, and Success Rate/% over 2.0) programs received in previous program reviews? How are programs expected to analyze success and attrition rates in their courses without this detailed data? *We are hoping to be able to provide this in the future.*

Expanded offerings

The entire general chemistry series is now offered during evening, and summer offerings have increased. CHEM 139 could be developed as a hybrid using the ALEKS system, but faculty don't see hybrid courses as an effective option for most of their highest enrolled courses with lab components.

Website

It is unclear who created content for the chemistry page on Seattle Central's website. Chemistry faculty did not write the text. The current text highlights Allied Health but does not mention STEM careers. The existing career list is not comprehensive. Chemistry faculty will meet soon to discuss content they would like to see on the page and provide edits to the web team that will give a more accurate depiction of their program. Also, regarding Chemistry's web presence, faculty can no longer access the server for their web pages so they use Canvas or Google pages (but they are concerned about being unable to take down the old web pages).

Open Education Resources

CHEM 121 and 139 have transitioned from adoption of \$150 - 200 textbooks (which many students elected not to purchase since they would only use the book for one quarter) to adopting a textbook that is free to students for the OpenStax text used in CHEM 161/162/163 and if chapters are downloaded individually for the Bishop text for CHEM 121 and 139. Alternately, students can make a donation to download the entire book for Bishop, or purchase the hard cover edition for about \$70 from the bookstore, which many students still prefer. Additionally, faculty use content from modules that were created as part of the Open Course Library initiative.

Commendations/Best Practices:

We commend many aspects of the Chemistry program:

- Impressive faculty participation on college committees and leadership, mentorship of students and tenure-track faculty, advising student clubs/research, professional development and curriculum development.
- Improvements in chemistry lab, including updating space to be in compliance with current safety practices and reducing “non-essential chemicals” and waste, thanks to lab techs/managers.
- Expanded use of ALEKS adaptive learning system to allow students to achieve mastery on topics particular to their needs and to allow faculty to respond to those needs in their teaching.
- Program-wide adoption of low-cost materials and open educational resources (OER).
- Use of the American Chemical Society (ACS) exams to assess students' understanding, skills, and preparedness for future STEM courses.
- Following SCC's search advocate program to hire the newest FT faculty member
- Great assessment & improvement work as noted in the IAC report. Best improvement work seen by members of the IAC. Learning outcomes are generally clear and measurable.
- Faculty collaborate with chemistry instructors at nearby institutions.

Concerns/Issues:

- The Program Review Committee was concerned about the progress on updating MCOs since the last review in 2014. We noted barriers to completing this work, outlined in the narrative above.
- The Program Review Committee reviewed submitted syllabi and noticed slight differences in language used for the ADA Statement.
- Chemistry faculty were concerned about the incomplete content on the Chemistry website.
- Chemistry faculty & staff are concerned that a replacement for the Environmental Health & Safety (EHS) Manager has not been hired after former EHS Manager left the college in March 2018. Elimination of the EHS manager is concerning because it means less frequent safety checks and the absence of valuable troubleshooting (i.e. SAM building ventilation issue).

Please see committee recommendations below.

Additional committee/VP of Instruction questions and program responses:

I want to commend the Chemistry department for its use of ALEKS for online homework and encourage them to explore ALEKS for placement opportunities for CHEM 161. Their use of open source or lost cost textbooks also deserves recognition. Thanks to the Chemistry department for being leaders in innovation and assessment.

I am pleased to see contact information below for CHEM faculty to provide content for the website that they can create as subject matter experts.

I would support a piloting the use of Tableau dashboard data for the CHEM department with the office of institutional effectiveness if this is something the department wishes to pursue.

Committee recommendations and suggested due dates for recommended action:

- Continue to update MCOs and college supplemental documents. Suggested Due Date: Winter 2020
- Ensure that ADA statements on syllabi are consistent with the rest of the college by using language sent annually by Disability Support Services. Ensure that new hires understand the importance of including this language on syllabi. Suggested Due Date: Spring 2019
- Send new website content to Mahim Lakhani & Reed Wacker via webteam.central@seattlecolleges.edu
Suggested Due Date: Fall 2019
 - Add a more comprehensive key to the program map and send the updated version to the web team so they can replace the outdated version that is currently on the website.
Suggested Due Date: Fall 2019

Report prepared by: Alyssa Jocson Porter

Date: December 4, 2018

Three-year follow-up action:

Follow-up prepared by:

Date: