



College of Alameda

2023-24 Annual Program Update: **Chemistry**

Program Overview

Please provide your program's mission statement and program's learning outcomes

COA chemistry offers general chemistry (Chem 1A/1B) for science majors, introductory general chemistry (Chem 30A/30B) for allied-health career track students. COA chemistry is a small program with one full time and three part time instructors. Demand for chemistry courses is high since these are prerequisite for almost any career in the sciences or health care industry.

Program Learning Outcomes (PLOs):

1. Demonstrate understanding of chemical processes to solve real-world problems
2. Collect and interpret analytical data using techniques in general chemistry.
3. Demonstrate the ability to perform basic calculations related to preparation of solutions and quantitative and qualitative analyses commonly used in experiments in chemistry.

List your program faculty and/or staff.

Full Time – Peter Olds
Part Time – Eileen Clifford, Alex Madonik

Describe your current utilization of facilities, including labs and other space.

One chemistry laboratory, Room 150 at the Science annex, (with four chemical hoods) can reasonably accommodate 25 students. This single lab is presently used for all chemistry courses offered at COA. Several Science Annex rooms including 110 and 160 are used for chemistry classes. Room D-119 on the main campus is also used for Chem 1A/1B lectures and chemistry demonstrations. We have been repeatedly assured that the refurbished D-109 chemistry lab will be functional as a Chem 30A lab space in time for spring 2024.

List your program goals from your most recent Program Review or APU. Then, provide an update on the status of the goal. Has your program achieved the goal? Have any of your goals been revised or are any still in progress? Lastly, make sure to discuss which College or District goal your program goal aligns to.

If no program goals exist or if this is your first program review, work to create 2-3 goals and align them with a College or District goal.

<p>Program Goal Bring laboratory management and oversight up to minimum standards. Mitigate the historical lack of safety regulatory compliance in COA labs.</p>	<p>Hire or appoint a qualified Chemical Hygiene Officer (CHO).</p> <p>Implement a Chemical Hygiene Plan (CHP) in COA science labs.</p> <p>Turn lab management and oversight over to technically qualified staff capable of maintaining safety regulatory compliance.</p>
<p>Status: In-Progress or Complete?</p>	<p>Kenmond Pang was just hired as lab coordinator and is in the required probationary period. So far labs he has set up this Fall 2023 semester are working fine. The previous two semesters Jacob and Eileen generously worked part-time at low pay to set up and run the chemistry labs, a huge improvement over past years. Core issues still remain: There is still no chemical hygiene officer (CHO) in place as required by law. The CHO's primary job is implementing a Chemical Hygiene Plan (CHP) also required by law. Jacob and Eileen are initiated an inventory system (for the first time in COA's history) as required by any chemical hygiene plans which Kenmond is developing further.</p> <p>A serious purchasing bottleneck still exists and budgeting and acquisition are not transparent to faculty. Items reported or understood as ordered often have not been ordered (recently the corrected order of Thermo-Fisher Spectrophotometers for Chem 1A/1B). Timely acquisition of laboratory chemicals and supplies is needed to provide students with the best possible laboratory experience. It is our hope that with a permanent lab coordinator now in place, budgeting and purchasing will become more transparent.</p>
<p>Which college or district goal is aligned with your program goal?</p>	<p>Advance student access, equity and success.</p>

<p>Program Goal Refurbish and bring up to satisfactory standards the abandoned D-109 main campus chemistry lab plus associated storage and prep areas.</p>	<p>This involved reinstallation of hoods and a complete plumbing upgrade. As of 9-26-2017 three hoods and bench faucets had been reinstalled in D-109. Another hood is requested for the D-105 Chem/Demo prep area in addition to lipped shelving and lab bench re-installation. Dry chemical storage area (location TBD) requires lipped earthquake-proof shelving. Balance room (D-108 or D-109?) needs stone tables replaced.</p> <p>It is also requested to refurbish and bring up to satisfactory standards for demos the D-119 lectern (gas and water) and D-119 chem demo prep area. (D-119 is the CHEM lecture room.)</p> <p>Quotes for the above work should be obtained ASAP from Thermo-Fisher, VWR and other laboratory furnishing companies.</p>
<p>Status: In-Progress or Complete?</p>	<p>Used as a storage area for Fab Lab for the several years, the main campus chem lab area was cleaned out for use by Chem 30A labs for the Spring 2022 semester. \$100 K was recently announced as allocated for the above upgrade by President Bajrami and the current hope is the space will be ready by the 2024 semester. Tentative plans and a \$96 M for a new science building were announced in 2020. As yet faculty have not been consulted regarding space, equipment and/or facilities needs and allocations for this future building. President Bajrami announced that the new building would no longer house administrators.</p>
<p>Which college or district goal is aligned with your program goal?</p>	<p>Advance student access, equity and success.</p>

<p>Program Goal Resume offering Chem 30B – Introduction to organic and biochemistry for allied health students.</p>	<p>This course was discontinued during Ana McClanahan’s tenure as dean and should be reinstated for nursing and physical therapy track students.</p>
<p>Status: In-Progress or Complete?</p>	<p>Stalled. Success is contingent on resolving laboratory issues like the current purchasing bottleneck and getting labs up to regulatory code.</p>
<p>Which college or district goal is aligned with your program goal?</p>	<p>Advance COA teaching and learning. Build programs of distinction.</p>

Program Goal	Integrate chemistry with new earth sciences program that embraces chemistry of rocks and minerals.
Status: In-Progress or Complete?	Several geology courses have been approved by the curriculum committee and the state, including mineralogy, which is essentially the chemistry of naturally occurring crystalline solids. However, geology program expansion has been historically hindered by a self-perpetuating cycle of low FTES allocations. President Bajrami as indicated she will allocate 7 FTE for new geology courses in the Spring 2024 semester. But these will be Geology 1 – physical geology and Geology 3 – historical geology which Prof. Lung Chan of UC Berkeley has offered to teach. Geology 2 – mineralogy will have to wait until these courses succeed.
Which college or district goal is aligned with your program goal?	Advance COA teaching and learning. Build programs of distinction.

Program Goal	Obtain a scanning electron microscope (SEM) with an EDS elemental analysis attachment for shared use between chemistry, physics, biology, and earth sciences. Hire a second additional FT faculty member whose responsibilities include instruction on using and maintenance of this facility. Coordinate with COA's CTE dean (and SEM manufacturer) to develop a SEM operator plus maintenance training program with this equipment modelled after San Joaquin Delta College's program: https://www.deltacollege.edu/program/electron-microscopy
Status: In-Progress or Complete?	CTE Dean Eva Jennings was approached and TESCAN manager Drew Irwin was interviewed in 2017. Subsequently stalled. This goal should be integrated with the new building plans.
Which college or district goal is aligned with your program goal?	Advance COA teaching and learning. Build programs of distinction.

Describe your current utilization of facilities, including labs and other space.

Pre-pandemic: One chemistry laboratory, Room 150 at the Science annex, (with four chemical hoods) can reasonably accommodate 25 students. This single lab is presently used for all chemistry courses offered at COA. Several Science Annex rooms including 110 and 160 are used for chemistry classes. Room D-119 on the main campus is also used for Chem 1A/1B lectures and chemistry demonstrations. The partially refurbished D-109 chemistry lab is still not practically functional, though we are hopeful functionality will be restored for Spring 2024 Chem 30A.

During the pandemic: Chemistry faculty were teaching from home online with Zoom plus various online academic and virtual lab platforms since late March 2020.

Since the Fall 2022 semester, Chem 1A, Chem 1B and one Chem 30A section are have resumed as in-person on the main campus using D-119 and 860 Atlantic rooms 110 and 160. In person labs have resumed in Room 150 at 860 Atlantic, currently the only available lab space for all chemistry courses.

Program Update

Using the dashboards, review and reflect upon the data for your program.

[Course Completion and Retention Rates – Instructional Dashboard](#)

[Enrollment Trends and Productivity Dashboard](#)

[Degrees and Certificates Dashboard](#)

Course Completion and Retention Rates

Course completion data and retention rates are not available for individual courses or departments. College of Alameda STEM completion rates were in the 65-75% range for semesters in the 2022-2023 academic year. Retention rates were in the 80-82% range during these semesters.

Enrollment Trends

An apparent enrollment drop correlates with a return to in-person chemistry classes during the Fall 2022 semester. This is beginning to recover in Chem 1B.

Degrees and Certificates

N/A

Describe any significant changes and discuss what the changes mean to your program. Consider whether performance gaps exist for disproportionality impacted students by using filters to disaggregate the data. Focus upon the most recent year and/or the years since your last comprehensive program review. Cite data points to support your reflection.

Enrollment declined in 2015-16 and more recently in 2018-19. (See data in previous program review.) These declines mirror the trend seen in general chemistry Chem 1A/1B and in 2018-19 were worsened by repeated cancellation of introductory organic and biochemistry Chem 30B. Student retention and completion rates are relatively stable. Offering enough sections to serve the available student enrollment population is a problem.

It is to be noted that Chem 1A/1B and Chem 30B require the most sophisticated laboratory experiments. So, the most recent decline in overall student enrollment may be related to administrative decision to defund hiring of high-quality student employees in lab settings during 2018-19. These student workers, when present, provided much needed support for struggling students and compensated for lack of qualified lab management.

In 2019-2020 completion and retention rates are typically in the 70-80% range except for Hispanic/Latino ethnicity and unspecified gender categories which had completion rates near 60%. The latter results are of questionable reliability due to statistics of small numbers, but the former is cause for concern. As a result, Chemistry faculty members are in active discussions about how to improve success rates for Hispanic/Latino students. Current ideas include drawing attention Hispanic/Latino students working in classrooms and chemistry-related jobs in the community, and making more use of available CoA tutoring facilities (MESA) and classroom instructional assistants to facilitate translation of course terminology if needed. The 70-80% completion and retention rates are systematically higher than previous years, possibly due to implementation of the Chem 30A prerequisite for Chem 1A.

Chemistry data specific for the 2022-2023 academic year is apparently not available online.

Pre-pandemic and during the pandemic we have observed reduced completion rates for students from Hispanic backgrounds as well as for African American students. We think some of these students lack family support/encouragement for their studies, and that they may have additional family or work responsibilities that interfere with their preparation for and attendance in class. These observations are an important motivation for supporting the MESA Connect program and for implementing the goals of the NSF HSI STEM grant received by CoA.

One goal under the HSI STEM grant is to implement Course-imbedded Undergraduate Research Experiences (CUREs) in some introductory STEM courses.

Describe the department's progress on Student Learning Outcomes (SLOs) and/or Service Area Outcomes (SAOs) since the last Program Review/APU.

See Eileen and Alex.

Describe the outcomes and accomplishments from previous year's funded resource allocation request. If your program did not receive any allocations, leave the boxes blank.

Brief description of funded request	Source (any additional award outside your base allocation)	Total Award Amount	Outcome/Accomplishment
<p>We were told that Chemistry had \$20,000 to spend on supplies and equipment for the 2022/2023 academic year and that unspent money would roll over. What happened to that money?</p>			
<p>What happened to the \$96,000,000 allocation for the new science building? What about the annual interest corresponding to that money? As yet, faculty have not been consulted regarding space, equipment and facilities allocations for chemistry, geology, geography and anthropology in this future building.</p>			

Prioritized Resource Requests Summary

In the boxes below, please add resource requests for your program. If there are no resources requested, leave the boxes blank.

Resource Category	Description/Justification	Total Estimated Cost
Personnel: Classified Staff Chemistry/Geology lab coordinator.	Establish and maintain regulatory compliance including: hazardous materials inventory implementation and maintenance, chemical hygiene plan implementation, both responsibilities of the chemical hygiene officer (CHO). Remediate and establish safe storage, use and disposal of hazardous chemicals. Set up experiments, maintain equipment, improve and expand laboratory facilities, purchase chemicals, equipment and supplies. All of the above in close collaboration with chemistry faculty. This person has recently been hired and may be qualified to carry out CHO tasks. But the SEIU took the CHO responsibilities out of his job description prior to his hiring.	\$100,000
Instructional Assistant for Gen Chem.	The current FT chemistry faculty would like to teach at least one outstanding former student how to teach, including the implementation of chemistry demos, lecturing, lab supervision and grading, etc. The activities would be in support of general chemistry lecture and lab.	\$50,000
Personnel: Student Workers 3-5 chemistry student workers and/or additional Instructional Assistants to assist faculty by:	-tutoring students -helping students in lab -helping lab coordinator with lab setup and cleanup -help students during review and problem solving sessions. -help faculty with driving and field trip logistics	\$50,000
Personnel: Part Time Faculty		
Personnel: Full Time Faculty Two full-time chemistry faculty are needed for this discipline. CoA has only one F/T instructor, a situation which has persisted for nearly two decades.	One new (additional) F/T CHEM instructor to teach Chem 1A/1B and Chem 30A/30B. Students and faculty both deserve stability and the benefit of faculty experience and job security.	\$130,000

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Resource Category	Description/Justification	Total Estimated Cost
Professional Development: Department wide PD needed	Meetings and conferences: Faculty need to stay current in their fields of expertise and research. Travel and registration fees for these meetings should be covered by COA.	\$30,000
Professional Development: Personal/Individual PD needed		
Supplies: Software	Subscription to cheminventory.net	Under \$100/yr
Supplies: Books, Magazines, and/or Periodicals	Journal subscriptions to JChemEd, Science, Nature, JACS, Geochemistry, etc.	~\$100/yr
Supplies: Instructional Supplies	An ongoing and adequate budget for Chemistry instructional supplies is needed in addition To permanent qualified oversight and management of laboratory inventory, especially chemical inventory management. The new lab coordinator may be qualified to take over these tasks. An unsolved problem is a bottleneck at the Peralta purchasing department and lack of budget transparency.	\$15,000
Supplies: Non-Instructional Supplies		
Supplies: Library Collections		
Technology & Equipment	<p>For Chem 1A, Chem 1B (gen chem) and Chem 18 (analytical instrumentation).</p> <ul style="list-style-type: none"> • A computer lab for analyzing data (and running simulations for gen/org chem), could be in conjunction with an expanded MESA • Lots of glassware: burets, columns (for chromatography), etc. • Another oven, more analytical balances • Ion sensitive electrodes • Cyclic voltammetry (\$6k) 	<p>TBD</p> <p>Rough estimate \$500 K.</p>

	<ul style="list-style-type: none"> • High performance liquid chromatograph (\$20–45k?) • Gas chromatograph/mass spectrometer <ul style="list-style-type: none"> ◦ Vernier makes a pocket GC, but I don't believe it'd be useful in the course • FTIR • Atomic absorption spectrometer • UV/Vis spectrometers capable of collecting kinetic traces. • Scanning electron microscope (SEM) with an EDS elemental analysis attachment 	
Library: Library materials/collections	A STEM library could be incorporated into the new science building. This could also have a mineral (solid crystalline chemical substances) display.	TBD
Facilities: Classrooms/Labs	Three lecture rooms plus three laboratories. <ul style="list-style-type: none"> • Chem 1A/1B • Chem 30A/30B • Future mineralogy lab 	TBD
Facilities: Offices	Five offices to accommodate three full-time and up to four part-time chemistry faculty.	
Other -	SEM lab to be shared with Physics, Biology and Geology	Get Tescan to make COA a demo/training site.