2023-2024 Program Review

Program Name:	**Chemistry**
Program Review Leader Names:	**Arif Karim**

Please type your answers into the blank spaces beneath each question. The box will expand as you type.

1	MISSION STATEMENT	1. Describe the overall purpose of your program. (Why does your program exist?) 2. What does your program do to fulfill its purpose?

The mission of the Chemistry Faculty is to enhance the quality of life by helping students attain knowledge, master skills, and develop the appreciation, attitudes, and values needed to succeed and participate responsibly in their communities. The Department's vision is to prepare its students for a diverse and changing world by:

Creating an environment that values and supports a culturally diverse and intellectually dynamic community and preparing students for global citizenship.

Developing innovative programs that facilitate student preparation for the baccalaureate experience.

Developing state-of-the-art technology to enhance teaching and learning.

2	**AWARDS AND TRANSFERS**	Provide data related to your program's completions and/or awards including badges and microcredentials and/or transfers. Include for each of the last three years: • how many graduates the program has had • the percentage of majors graduated relative to declared majors • changes in awards offered and why they were made, including any new awards added or older awards expired • transfer rates, if applicable and available • major transfer institutions. (You will discuss this data in more detail in Question #17.) RELATED DATA: a. Number of Majors (available in TIPS, ACC Fact Book) b. Number of Graduates (available in TIPS, ACC Fact Book) c. Number of Transfers (available in TIPS? IPEDS?). If not applicable, please state, "Not Applicable."
In 2020, 25 students received Associate's degrees in chemistry. In 2021, this number was 19. In 2022, 24 students received Associate's degrees. There were 178 declared majors in 2020, 158 in 2021, and 128 in 2022. In 2020, the transfer rate was 57%. In 2021, it was 57%. In 2022, it was 44%.		
3	**WHAT HAS CHANGED? (Since Last Program Review)**	1. Describe the implementation and results of the priority initiatives crafted during the previous program review. 2. Describe other significant changes that have happened to your program since the last program review. If this is the first program review for your program, state that and indicate "Not Applicable."

The previous program review discussed upcoming efforts to improve upon the department-wide general chemistry 1 lab assessment (final lab exam). This has been completed and a standardized assessment is used by all sections of the course. Improved data analysis on the results of this exam were discussed in the previous program review, but no changes have been made on this issue so far.

Enrollment in the department is down substantially over the past few years. In Fall 2020, there were 3003 students served by the department. In Fall 2022, there were only 1911.

Changes since the previous program review include the addition of dedicated ECHS general chemistry 1 courses, hyflex courses, 8 week courses, and online lectures with an in-person lab component. The department currently consists of 15 full time faculty and 12 adjunct faculty, compared to 16 of each at the previous program review.

4	**INSTRUCTIONAL LOCATIONS**	Where do you provide in-person instruction, and explain how these locations meet or do not meet your program's needs. List as applicable: • campuses • remote sites • high schools • other locations.

The department provides instruction in traditional classrooms, laboratory classrooms, laboratory spaces, and instrumentation/computer rooms. ECHS lab and lecture sections are offered at the round rock campus.

5	**FACILITIES**	What facilities are used or needed by your program, and explain how your current facilities meet or do not meet the needs of your program. List as applicable: • dedicated classrooms • general classrooms • labs • office space • meeting rooms • outdoor areas • other teaching and work spaces.

The department uses general classrooms, lab classrooms, lab spaces, and instrumentation/computer rooms. Faculty and staff have standard office spaces. The majority of meetings are conducted virtually.

6	**EQUIPMENT & TECHNOLOGY**	List the type and quantity of equipment and technology resources used by your program. Are these resources adequate to conduct course instruction in your program? If not, what additional equipment and technology resources are needed to carry out instruction and/or improve the quality of course instruction? Consider: • capital equipment • storage equipment/cabinets • other specialized equipment/furniture • computer hardware/software.
The department uses analytical lab instrumentation and computers. Chemicals are stored in appropriately rated flammable cabinets as needed. Needs for the department include additional computers and modern analytical instruments as well as safety equipment to ensure safe working conditions for all students and employees.		
7	**REVENUE**	Identify any major external sources of revenue for the program. Consider: • grants • partnerships • sales/services. If not applicable, please state, "Not Applicable."
Not Applicable		
8	**BUDGET SHORTFALLS**	Identify any areas where budgetary constraints are restricting your program and discuss the effects. If not applicable, please state, "Not Applicable."
Not Applicable		

9	**INTERNAL & EXTERNAL COMMUNICATION & MARKETING**	How does your program use different forms of communication to reach and/or market to the following audiences: (1) potential students, including those not traditionally represented in your program, (2) current students, and (3) other faculty, staff, and external stakeholders? In addition, list the forms of communication used and describe their effectiveness. Identify areas for improvement and/or potential strategies to be implemented in the future. Consider: • brochures • posters • other print media • websites • social media • email • ACC TV• recruitment fairs • high school visits • other events or methods.
The department does not currently conduct any outreach to potential students. For current students and faculty, flyers are used to advertise honors courses, chemistry club events, and seminars held as part of the CREATE (Chemical Research at Texas) program. The flyers are placed at all campuses and appear to be effective. As the department has seen a dramatic decrease in enrollment, it would seem that outreach to prospective students should be a priority going forward.		
10	**EXTERNAL ACCREDITORS**	Other than SACSCOC and the Texas Higher Education Coordinating Board, does your discipline have any outside regulatory/accrediting bodies? If yes, your response should include the following: • List your program's regulatory/accrediting bodies. • Are there any regulatory/accrediting bodies available that your program is not recognized by. If so, are you seeking accreditation or why not? If not applicable, please state, "Not Applicable."
Not Applicable		

11	**COMMUNITY PARTNERSHIPS & NEEDS**	1. Does your program have a Memorandum of Understanding (MOU) or other community partnerships (sharing of facilities, affiliation agreements, volunteer opportunity agreements, co-curricular agreements, etc.)? If so, describe how this benefits students and the program. 2. How does your program gather information regarding community needs (e.g., advisory committees, environmental scans, etc.) and how is such information used? If not applicable, please state, "Not Applicable."
Not Applicable		
12	**POSITIONS**	List the positions within your program, and note the number of each including any current vacancies for permanent faculty or staff. Include as appropriate: • faculty (full-time and adjunct) • instructional associates • administrative support • technicians • hourly/temporary personnel • others. Include, as appropriate, relevant information that impacts the number and types of positions.
The department consists of 15 full time faculty, 12 adjunct faculty, 12 lab technicians, and 1 administrative assistant. The department has a department chair and two assistant department chairs. With 12 lab technicians, the department can ensure that all labs at all campuses are appropriately staffed at all times.		

13	**PROFESSIONAL DEVELOPMENT**	Regarding faculty/staff professional development in your program: 1. How are program and instructor professional development needs determined, such as portfolio & staff evaluations and student evaluations, changes in equipment, different instructional methods, cultural awareness? 2. Where do your faculty and staff obtain their professional development (TLED, ACC HR, intra-departmental developed, outside sources, etc.)? 3. When pertinent, how is this new knowledge disseminated across the program/among faculty and staff?
Professional development is sometimes incorporated into monthly department meetings to familiarize faculty with new laboratory experiments or to provide updated safety training to department employees. There is not a specific method for determining professional development needs in the department. But, recent trainings have included presentations on new electronic homework systems and resources from Openstax (OER). Some faculty have also recently completed training for teaching distance learning and hyflex courses through TLED.		
14	**DISTANCE LEARNING FACULTY**	How do you ensure that all faculty teaching distance education sections have completed any training related to that modality (eg., HyFlex, ONL, DLS, etc.)? Describe any additional program expectations related to improving or maintaining the quality and effectiveness of teaching distance education courses. If not applicable, please state, "Not Applicable."
Eligibility to teach distance learning courses is confirmed by the department chair.		

15	**STUDENT CHARACTERISTICS & DEMOGRAPHICS**	1. What students do you serve, and how do they compare to the overall college and community? Your response should include answers to the following: • What are their demographics/characteristics (race, ethnicity, age, gender, Pell grant status, full/part-time)? • Include any additional relevant data related to student demographics and characteristics. 2. To the degree possible, describe your students' short- and long-term academic/career goals (student intent)? If this information is unavailable or unknown, please explain. RELATED DATA: a. Student Diversity (available in TIPS) b. Enrollment Data (available in TIPS) c. Departmental Snapshot.
In Fall 2021, the department had 158 chemistry majors. Of these students, 42% were White (66), 33% were Hispanic (52), 10% were other (16), 8% were Asian (13), and 7% were Black (11). Of the 158 majors in Fall 2021, 61% were female (96) and 39% were male (62). The overall success rate for the 2517 students served by the chemistry department was 79% vs. 74% collegewide. Completion rates by race, ethnicity, and gender are nearly identical to the collegewide statistics. Distance learning completion rates are slightly higher for all races, ethnicities and genders compared to the collegewide data. In general, our students are a mixture of recent high school graduates and students who already have a bachelor's degree, but have decided to pursue work in the health sciences.		
16	**STUDENT SUCCESS BY MODALITY**	Discuss success indicators related to different teaching modalities, such as ONL, DLS, HyFlex, and F2F. Examine: • withdrawal rates • grade distributions • the extent to which students achieve the learning outcomes. What steps have been taken to address any such differences between student success in various modalities? How effective have these steps been? If not applicable, please state, "Not Applicable." RELATED DATA: a. DAC Data (available in TracDat/Nuventive Improve) b. grade distribution data (TIPS) If not applicable, please state, "Not Applicable."

For all students served by the chemistry department, the completion rate in Fall 2021 was 75%, compared to 74% collegewide. The success rate in Fall 2021 was identical for F2F and distance sections.

In Fall 2022, the overall success rate was 79%. The success rate was once again nearly identical for F2F and distance education sections. For distance education, the department success rate was 78% compared to 70% collegewide.

Given that success rates are nearly identical for traditional and distance learning courses, no steps need to be taken to address differences between the modalities.

17	**BARRIERS TO STUDENT ACCESS/SUCCESS**	Discuss the recognized barriers to student access and success within your discipline. Consider: • academic preparedness • any significant factors (positive or negative) impacting completion rates within your discipline (refer to Question #2 to support this answer with data) • disabilities • access to technology • often under-served populations • locations at which courses are offered • scheduling • child care • financial aid • veterans' issues • transportation.

Barriers to student success include a lack of prior chemistry coursework to provide the background necessary to take courses in our department. In addition, sufficient mathematical skills, particularly in algebra, are essential for success in chemistry.

Courses are offered at all campuses in a variety of time slots, allowing students flexibility in choosing the times for their courses. The department has also unlinked the majority of lab and lecture courses, allowing students to take any combination of lecture and lab, providing additional scheduling and transportation flexibility. The department also offers some online and hyflex courses to make it easier for students to participate in our courses.

The laboratory setting may provide some difficulties for students with physical disabilities, but our lab classrooms have designated areas which are designed for use by students in wheelchairs. Access to technology is a critical component for most courses in our department. Many, but not all, of our campuses have computer labs attached to the chemistry lab to help facilitate student use of technology as part of our courses.

18	**STUDENT SUPPORT SERVICES**	What support services does your program offer to students outside of course instruction? Examples might include: • supplemental instruction • advising • outreach • student clubs • referrals • tutoring • library instruction • workshops. Describe the program's view of the effectiveness or ineffectiveness of these support services.
Tutoring services through the learning lab in chemistry have been offered at all campuses and regularly used by our students. The library research assignment that is part of CHEM 1111 (general chemistry 1 lab) involves instruction from research librarians at each campus along with guidance provided by chemistry faculty. Supplemental instructors and embedded tutors are used in some courses as well. The department has a Chemistry Club.		
19	**CURRENT STUDENT FEEDBACK**	How does the program gather information from students to improve classroom instruction, facilities, curriculum, scheduling of courses, equipment, future course offerings, student support services provided, etc. How is this information used to make improvements?
Current student feedback is received through the college-wide faculty evaluations. This information is used primarily for faculty evaluations, but not directly for course improvements.		
20	**GRADUATE WORKFORCE PREPAREDNESS & OUTCOMES**	How do you gather information about graduate workforce preparedness ? What are the results and how are they being used? What percentage of the program's graduates are employed? Of those employed, what percentage are employed in-field? If not applicable, please state, "Not Applicable."
Not Applicable		

21	**ALTERNATIVE FORMS of EVALUATING & AWARDING CREDIT**	List the type(s) of Credit for Prior Learning (CPL) offered in your program (e.g., these may include receiving credit from 1) transferring courses taken at other institutions; 2) a departmental exam, perhaps including a skills exam; 3) advanced placement (AP) exams; 4) CLEP exams; 5) coursework in the International Baccalaureate program; 6) military training and education; 7) industry recognized certifications; 8) conversion of continuing education coursework; 9) training with a community-based organization articulated through continuing education; 10) ACCTech/Tech Prep; 11) recognized industry apprenticeship programs; 12) admission to accelerated programs based on previous licensure and/or work experience; and/or 13) portfolio assessment.) Describe the processes involved and challenges of offering a greater variety of CPL.
Credits from other colleges and universities are accepted. AP credit from high school level courses is also accepted.		

22	**MASTER SYLLABI**	Make sure the master syllabi posted on the master syllabus repository are up to date (i.e., from the current academic year). Do the master syllabi include all required components? What is your discipline's process by which you review, update and publish master syllabi? Your response should include answers to the following: • Are master syllabi posted in another location besides the college's master syllabi website? • List where the syllabi are posted elsewhere, if applicable, and are they the same?. • If they are posted elsewhere, are they the same? Since the last Program Review, have there been any significant changes to the master syllabi and why (textbook changes; course objective changes; etc)? • List any new courses that have been added or old courses that have been expired. • When were the master syllabi last revised?
Changes to the master syllabi are implemented through monthly department meetings as well as discussion between faculty members via email. Voting on changes generally takes place at department meetings, but has also been done via email. Most major modifications to the master syllabi were made in 2017, including updating of textbook information and inclusion of the concealed handgun policy. The master syllabi are not posted anywhere other than the ACC website. The syllabi contain all required components as indicated by the master syllabus checklist.		
23	**CURRICULUM DESIGN**	How does the program design, review, and implement its curriculum? Provide specific examples. Also consider items such as: • ways in which faculty meet and discuss changes or updates to curriculum • degrees and certificates the program confers • dates new awards, courses, or programs were started since last Program Review • substantial curriculum changes • scheduled review of curriculum • textbooks used • faculty training regarding the curriculum.

The design and review of curriculum is conducted through monthly department meetings as well as regular discussions via email. Topics discussed include textbook selection, modification of laboratory experiments, adoption of online homework systems, and improving measurements of student success.		
24	**INSTRUCTIONAL METHODS, DETERMINATION, & RATIONALE**	1. What instructional methods are used by your program in its courses? List all that apply, such as: • lectures • laboratory activities • case studies • project-based learning • competency-based instruction • collaborative learning • learning communities • portfolios • internships • clinical/practicum • field activities • simulations. 2. What educational technologies do faculty members generally use? Which ones have been implemented since the last program review? 3. What new instructional approaches, such as belonging, cultural awareness, universal course design, etc., have been implemented since the last program review? 4. What successes and challenges were encountered in trying to implement the methods/approaches listed above?
Courses in the chemistry department are divided into lectures and accompanying labs. Some faculty use tablets for in class and online teaching as well as online homework systems. The increased use of technology requires our students to have access to their own technology. In addition, the CHEM 1111 class includes a library assignment, which is primarily conducted by the research librarians at each campus. Faculty assist students in finding modern relevant research topics and students are then provided with instruction on the use of research resources available at ACC.		

25	**INSTRUCTIONAL MODALITIES**	List your instructional modalities: On-Campus Options (In-Person/Face-to-Face – F2F, Hybrid Classroom – HYC, Hyflex – FLX) and Distance Education Options (Online – ONL, Synchronous Virtual Class Meetings Required – DLS, Hybrid Distance – HYD). Are certain modalities challenging or ineffective for this program or particular courses? If so, why?
The department uses F2F, ONL, and FLX courses. Technically, the ONL courses are hybrid because there is a mandatory in-person lab component for these online lecture courses. There does not appear to be an appreciable difference in student success between the F2F and ONL courses. In Fall 22, the majority of classes were offered F2F with a few online sections. The completion rate was 79% for F2F and 78% for ONL. FLX courses have not been running for very long in our department, so there is not significant data to consider.		
26	**USE OF DISCIPLINE ASSESSMENT CYCLE RESULTS**	How does your program use the results of the Discipline Assessment Cycle (as reported in TracDat) to improve things such as curriculum, instruction, assessment, and student performance? How are results shared, discussed, and action strategies developed? What has your program learned from the assessment data? What problems has your program encountered in implementing assessments and/or action strategies? How were these problems resolved?
At the moment, assessment results are being used to confirm student competency on key topics. Discussions among faculty members mostly involve confirming target achievement levels were met and proposing new questions to be added to future iterations of the comprehensive exams. A more detailed question by question or topic-based analysis of the comprehensive exam results should provide meaningful assessment results and lead to fruitful discussions among faculty. Efforts toward improving the existing lab exam for general chemistry 1 and creating a new lab exam for general chemistry 2 are ongoing. Improving the data analysis procedures is also a priority.		
27	**ACADEMIC RIGOR & CONSISTENCY**	How does the program ensure that there is rigor and consistency across course sections? Provide specific examples. Discuss items such as: • ways in which faculty meet to discuss instruction, projects, and other assessments • use of assessment data • master syllabi • faculty training • faculty evaluations • external bodies.

Academic rigor is primarily monitored by faculty portfolios. Assistant department chairs confirm the quality of content in the portfolios. Instructional methods and assessment are commonly discussed in monthly department meetings. Currently, the results of assessment are not directly used to modify curriculum or teaching methods.		
28	**STRENGTHS, WEAKNESSES, OPPORTUNITIES, & THREATS**	Now that your Program Review has been completed and shared with your program, conduct a SWOT Analysis with your program to determine your strengths, weaknesses, opportunities and threats. Explain how you shared the Program Review and promoted and facilitated the SWOT and the process for providing feedback. Include who was involved, e.g., faculty, staff, students, and other stakeholders. Include at least two key findings for each SWOT category in your response and why those are the most significant. Upload SWOT results into the Documents Repository in Nuventive Improve (TracDat).
Strengths: The department has a highly experienced and diverse faculty. There is sufficient staffing of our labs during all hours of operation by well-qualified lab technicians. Weaknesses: Although some labs have modern equipment, other labs will soon be in need of lab upgrades, including new computers and instrumentation. Lab infrastructure at some campuses is also not optimal for conducting experiments that require ventilation. Opportunities: The expansion of the Texas A&M one semester chemistry class to other campuses will likely lead to increased enrollment in future semesters. The recent addition of more sections of online and hyflex classes will also hopefully allow more students to take our courses. Threats: Enrollment numbers for the department have decreased over the past 3 academic years. The resulting decrease in course offerings may make it difficult for students to find the courses they need at their local campuses. The department needs to consider the effects of the increased availability of AI and its impact on student writing and remote exams.		
29	**PRIORITY INITIATIVES**	Now that your program's SWOT has been completed, list at least three priority initiatives the program intends to implement over the next three years. Explain why these initiatives were chosen.
1. Expand CHEM 1309/1109 (one semester lecture and lab courses for Texas A&M engineering students). The anticipated increase in enrolment of this program has made this initiative a priority. The expansion will ensure that more campuses have the necessary lab equipment to conduct the experiments specific to this course. This initiative is entirely out of immediate		

necessity.

2. Revise the quantitative reasoning/ critical thinking assessment to get more valuable data. This assessment is a 10 question final lab quiz for general chemistry 1 lab. The goal is to get data broken down by question to make it clear which specific topics our students are struggling with. The department also aims to implement a similar assessment in the second semester general chemistry lab. This is an essential initiative because it will help faculty to understand key challenges students are having in the first semester course. Given that many of our students continue on to additional chemistry classes, addressing any knowledge shortfalls after the first semester will be critical to student success in future courses.

3. Consider revisions to the library research project conducted in general chemistry 1 lab. Currently, students are asked to research a modern topic in chemistry at our campus library and write a brief (2 page) paper about the subject. Some faculty have concerns about the use of AI on this assignment. There is the possibility to embrace the availability of AI and incorporate this in the assignment. Another option would be student presentations instead of the written assignment.

30	**PLANNING INFORMATION**	Ensure the program's planning information (goals, objectives, measurement plans, and results) is complete and current in Nuventive Improve (TracDat). How does this Program Review inform or impact your program's planning information? Briefly describe how your planning objectives are determined and how you communicate this information to your faculty and staff.

This program review provides a reminder of the current threats to the department as well as our upcoming needs. In particular, the department will need substantial instrumentation and infrastructure upgrades in the next few years to continue offering lab courses at all campuses.