



CALIFORNIA STATE UNIVERSITY, LONG BEACH
VICE PROVOST FOR ACADEMIC PROGRAMS

Memorandum of Understanding

This MOU has been read and approved by:

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Department of Chemistry and Biochemistry
College of Natural Science and Mathematics

June 2022

This Memorandum of Understanding outlines the consensus reached by the Department of Chemistry and Biochemistry, the College of Natural Science and Mathematics, and the Division of Academic Affairs, based on the recent program review (self-study in 2019, the external review conducted in December 2020 with report received in November 2021, and UPRC report in April 2022). It describes the goals to be achieved, and the actions to be undertaken by all parties to this MOU to achieve these goals, during the next program review cycle. Progress toward goals is to be addressed in an annual report.

Currently, the undergraduate and graduate programs offered by the Department are the B.S. Chemistry, B.A. Chemistry, B.S. Biochemistry, B.A. Biochemistry, M.S. Chemistry, and M.S. Biochemistry. The previous MOU for the program was in 2014, and the recommendations were partially addressed. The Department has addressed some obstacles to graduation through curricular changes (ALEKS, addition or increased offering of courses such as CHEM 375, 379 etc.), though how assessment of learning has fed into strategizing on graduation barriers is less clear. The Department has made improvements in clarifying how assessment methods align with learning outcomes at the course level. While it appears that active assessment is occurring at the course levels, reporting to Academic Affairs on program level learning has been less active. A comprehensive assessment plan for the graduate degrees was not provided in the self-study, with the exception of positive trends in graduate student research and PhD placements. The Department has developed a five-year hiring plan, Chemistry and Biochemistry 5Y Hiring Plan (2019-2024), and has identified that additional space allocation will be needed if new hires are granted.

A number of strengths were identified in the reports:

- The contribution of the Department to General Education. Since 2012, FTF in the major has averaged around 25% while non-major students have represented around 74-75% of the Department's FTF.
- The Department has experienced a steady increase in the headcount of graduate majors in the last few years. In Fall 2017, the graduate programs in the Department showed a headcount of 42, which has risen to 55 in Fall 2021.
- Improving student learning: the department has conducted significant curriculum changes to address the low completion rate issue for first-year General Chemistry courses. An online assessment program and problem-solving program using the ALEKS

program were offered to help prepare students for incoming classes and place them into the correct courses. These practices successfully improve the completion rate and reduce graduation time.

- The Department is making good progress in improving retention and graduation rates for native freshmen and transfer students; the 4/5/6 year freshmen graduation rates (students starting and graduating in one of the majors offered by the Department) rose from 4.9%/15.6%/18.0% for 2012 cohort to 14.1%/32.6%/27.7% for freshmen cohorts admitted in 2017, 2018, and 2019 respectively. In comparison, the 2-year graduation rate for 5th semester students has risen from 16.3% (2013 cohort) to 31.4% (2017 cohort), demonstrating strong positive trends in graduation. The 1-year rate for 7th semester natives has risen from 32% (2014 cohort) to 48% (2017 cohort). Likewise there is an improvement in two-year graduation rates for transfer students (26.3% for 2015 cohort vs. 37.7% for 2019 cohort). These gains in student success metrics translate into increased size of chemistry and biochemistry graduating class (total number of BS degrees rose from 204 (2011-14) to 298 (2018-21)).
- The department's effort of promoting faculty-student research and creative activity collaboration for undergraduate and graduate students is commendable.

Areas of Concern/Opportunities were noted in the reports:

- Although the Department has already developed a comprehensive five-year hiring plan covering the period 2019 – 2024, this plan should be reviewed and revised as needed to address increasing instructional, research and service needs.
- The PARC Reviewers observed that "The Department has worked diligently on curricular changes to low-completion courses, as well as moving organic chemistry courses to the lower division, which allowed transfers to articulate this requirement." These actions resulted in a "clear improvement of the transfer students' graduation rates within two, three, and four years" (p.4), furthermore the reports recommends that "Department continue exploring strategies for mitigating attrition of 1st year and 2nd year students as well as any potential barriers to graduation." The external evaluators acknowledge department's efforts in improving student success in key courses, particularly in general chemistry/organic chemistry sequence. These efforts align with the CSULB strategic priority of becoming student ready campus. Moreover, while most of the retention/graduation indicators show positive trends, the Department's rates in these areas need improvement in order to improve native retention and reach GI 2025 graduation goals in the next few years. For example, while six year freshmen graduation rate within major rose from 18% for 2012 cohort to 28% for 2015 cohort starting in Chemistry & Biochemistry, the six year rate for the Department of Chemical Engineering rose from 44% and 59% respectively.
- There is an opportunity to further develop 2 of the Department's newer programs, the BA in Biochemistry and the BS in Chemistry with an option in Material Science.
- The BA in Chemistry demonstrates a steady decline in headcount since 2016 (has consistently dropped from 39 to 16 in 2021). This is a clear outlier from other undergraduate degrees, necessitating further analysis.
- Inconsistent trends in graduate student graduation rates have resulted in inconsistent trends in degrees awarded for both the MS in Biochemistry and the MS in Chemistry.

The UPRC recommends that the Department explore this issue and strategize to mitigate graduate student attrition and improve both 2 and 3-year graduation rates.

- Measurable Student-focused learning outcomes need to be developed, aligned with program learning outcomes, and measured as a part of a comprehensive multi-year assessment plan.
- The Department should consider developing and offering more service-learning opportunities.

It is therefore agreed that the Department will:

1. Continue to dialogue and strategize with the College and other academic departments as appropriate in terms of hiring and planning in accordance with available resources, taking into consideration the suggestion of hiring a faculty in Chemistry Education and opportunities to further develop the Materials Science program in B.S. Chemistry and B.A. in Biochemistry in terms of interdisciplinary educational and training experiences.
2. Analyze the trends in degrees awarded in all programs offered in the Department, disaggregated by demographic parameters in relation to enrollments and FTF graduation rates, specifically looking at the effect of DFW rates. Strategize and implement initiatives to remove any potential barriers to graduation.
3. Conduct and analyze research on underlying issues connected with declining headcount in the BA in Chemistry and strategize accordingly.
4. Continue exploring strategies for mitigating attrition of 1st year and 2nd year STEM freshmen (chemistry, biochemistry, biology, and chemical engineering) with emphasis on the impact of DFW grades in general chemistry and organic chemistry course sequence (CHEM 111A/CHEM 111B/CHEM 220A/CHEM 220B)
5. Explore strategies for improving 2 and 3-year graduation rates for M.S. degrees and ways to mitigate graduate student attrition.
6. Develop a multi-year assessment plan of direct assessment at the program level and report on closing the loop activities to illustrate that continuous learning outcome data are used to inform program level decision making. Explore revising Department PLOs to be measurable in terms of student learning. Ensure that rubrics are aligned with their stated outcomes. Consistently engage in an ongoing program of assessment of institutional, programmatic, and student learning outcomes across the curriculum, providing an annual update (due June 1) on progress made towards MOU actions to the CNSM Dean, the Vice Provost for Academic Programs, and the Coordinator of Program Review and Assessment. The review cycle will be from 2021-2028. A comprehensive self-study will be due June 1, 2028 for the program review process.
7. Consider developing more service-learning opportunities or course-integrated internships for students.

The College of Natural Sciences and Mathematics and CSULB Administration will:

1. Support the department in their strategic hiring plan as resources permit, and assess the opportunity of redistributing and reallocating research resources to maximize efficiency.
2. Provide resources to support the department in developing and updating, reporting on program learning outcome assessment and closing the loop activities.
3. Support the department in ongoing assessment and redesign of all aspects of student's experience, including curriculum structure, course placement, course pedagogy, academic advising, and other aspects of student's learning with an eye on educational

equity and student success.