Academic Program Assessment
AY 2024-2025 [Due 6/1/25]

Program Name	Date Completed
Chemistry	
Report Completed By	Report Contributors
David Dillon	
Brief Statement of Program Mission and Goals	

Table I Closing the Loop – SLO 1

Report on at least one data-informed change to your curriculum during AY 2024-2025 that was implemented to improve student learning, in response to prior assessments or other data.

A. Describe issues or SLOs addressed in the AY 2024-2025 cycle. Paste SLOs verbatim below.
• Apply basic knowledge of related fields such as mathematics and physics to problem solving, methods of analysis and use numerical data in the chemical sciences.
B. In which academic year and semester was this SLO last assessed to generate data that informed the change(s)?
Spring 2025
C. What were the recommendations for change in the previous cycle? (See Column H in the previous cycle's report.)
Flipped classroom approaches have been implemented by at least one General Chemistry instructor, and to a lesser degree by at least one Organic Chemistry instructor.
D. How were the recommendations for change acted upon?
Restructuring of classroom assessment items to include use of quiz scores for up to 10% of exam scores, and promoting more student at-the-board work with critique by instructor.

E. How did the change(s) impact student learning? If the change was not effective, what are the next steps or new recommendations?
While still widely variable, overall higher scores on in-class exams and on the ACS final exam were notes.

Table I Closing the Loop – SLO 2

Report on at least one data-informed change to your curriculum during AY 2024-2025 that was implemented to improve student learning, in response to prior assessments or other data.

A. Describe issues or SLOs addressed in the AY 2024-2025 cycle. Paste SLOs verbatim below.
• Read, think and write critically and review current literature in the chemical sciences.
B. In which academic year and semester was this SLO last assessed to generate data that informed the change(s)?
Spring 2025
C. What were the recommendations for change in the previous cycle? (See Column H in the previous cycle's report.)
No changes suggested in prior report.
D. How were the recommendations for change acted upon?
Although no changes had been suggested, the following changes were made. 1 – One organic chemistry instructor implemented multi-step synthesis problems as semester assignments. These were based on current literature and students were allowed / encouraged to use resources including literature and other faculty for guidance. 2 – One organic chemistry instructor increased the number of short formal reports with detailed analysis of experimental results to include use of literature and professor guidance. 3 – Both organic chemistry instructors made use of student presentations (PowerPoint or "chalk talk") simulating presentation of research in a professional conference.

E. How did the change(s) impact student learning? If the change was not effective, what are the next steps or new recommendations?

Table I Closing the Loop – SLO 3

Report on at least one data-informed change to your curriculum during AY 2024-2025 that was implemented to improve student learning, in response to prior assessments or other data.

A. Describe issues or SLOs addressed in the AY 2024-2025 cycle. Paste SLOs verbatim below.
• Exhibit a comprehensive knowledge of the fundamental theories, concepts and skills necessary in the chemical sciences.
B. In which academic year and semester was this SLO last assessed to generate data that informed the change(s)?
Spring 2025
C. What were the recommendations for change in the previous cycle? (See Column H in the previous cycle's report.)
Math ability continues to be an impediment to success of students in General Chemistry. A few years ago we implemented a requirement to either take and pass CHEM 111 or achieve an acceptable score on our Chemistry placement test to enroll in CHEM 121. This has caused some inconvenience for Biology majors, but we have continued offering CHEM 122 in summer to enable students to stay on sequence for the 2nd year chemistry courses.
D. How were the recommendations for change acted upon?
We have continued to offer CHEM 122 in summer.
E. How did the change(s) impact student learning? If the change was not effective, what are the next steps or new recommendations?
We are still collecting data to determine the effectiveness of the CHEM 111 prereq in preparing students for CHEM 121 – i.e. comparing historical DFW rates in CHEM121 before implementing the CHEM 111 prereq with DFW rates in CHEM 121 since that change.

Enter Table I Closing the Loop Comments Below

ACS scores are used on a semesterly basis to assess program outcome in each of the core subdisciplines. For 2024-2025, those average scores are:

COURSE	FA EXAM	RAW	PERCENTILE	SP EXAM	RAW	PERCENTILE
CHEM 121						
CHEM 122						
CHEM 301	OR21F	35.0	30.0	OR21F	38.2	38.0
CHEM 302	OR16	39.2	59.6			
CHEM 317						
CHEM 321						
CHEM 322						
CHEM 411						
CHEM 412						
CHEM 419						
CHEM 420						

Our target for each ACS exam is for class average score to be at or above 50th percentile. Some of these core courses are also taken by Biology majors and CBC majors.

MFAT scores are use over a longer term to assess performance of chemistry majors in the core subdisciplines. Composite percentile scores at or above 50th percentile is an indicated of success in each subdiscipline.

Fall 2022 graduates had scores on the MFAT of 155 / 72nd percentile (J.G.), 153 / 69th percentile (M.L.), 149 / 60th percentile (K.S.), 166 / 87th percentile (S.W.) and 142 / 42nd percentile (M.W.). Four of the five students in this cohort met our goal. Subscores for this class in physical chemistry, organic chemistry, inorganic chemistry, and analytical chemistry were 53, 47, 65, 59 (J.G.); 47, 56, 48, 50 (M.L.); 39, 50, 65, 39 (K.S.); 71, 47, 68, 74 (S.W.); and 47, 29, 51, 53 (M.W.).

Spring 2024 graduates (including 2023 and 2024) had scores on the MFAT of 131 / 7th percentile (A.G.), 139 / 29th percentile (A.M.), and 163 / 83rd percentile (L.S.) Subscores for this class in physical chemistry, organic chemistry, inorganic chemistry, and analytical chemistry were 36, 26, 32, 31 (A.G.); 41, 37, 35, 39 (A.M.), and 65, 45, 71, 68 (L.S.). One out of three students in this cohort met our goal.

Spring 2025 graduates had total scores on the MFAT of 145 / 49th percentile (E.C.), 143 / 44th percentile (K.J.) and 179 / 96th percentile (I.M.). Subscores for this class in physical chemistry, organic chemistry, inorganic chemistry, and analytical chemistry were 36, 42, 54, 56 (E.C.); 53, 37, 41, 50 (K.J.), and 77, 79, 74, 74 (I.M.). One out of three students in this cohort met our goal.

Of these 3 cohorts, 6 out of 11 students met our goal.

Only the fall 2022 cohort had sufficient number of students for summary assessment indicators. For biochemistry aspects, the CSUP average was 56% versus 49.9% nationally, and the critical thinking and reasoning indicator was 47% versus 41.4% nationally.

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Table II Annual assessment of Student Learning Outcomes (SLOs) in AY 2024-25

1. Include information to share assessment processes, results, and recommendations for improved student learning. Copy this table for each assessed outcome.

A. Program SLO assessed in this cycle. Copy the SLOs verbatim from the assessment plan.
• Apply basic knowledge of related fields such as mathematics and physics to problem solving, methods of analysis and use numerical data in the chemical sciences.
B. Semester and year this SLO was reported on prior to this cycle.
Fall 2024 and spring 2025.
C. Describe the assessment method for this SLO.
Performance on ACS exams for each course populated mostly by chemistry majors.
D. Described student group(s) assessed. Provide the number of students or number of artifacts assessed.
For CHEM 121 (14 fall students and 32 spring), 122 (32 and 20), 301 (30 and 21), 302 (11 and 31), 311 (6), 411 (14), and 412 (7), the student population included significant numbers of biology and CBC majors along with majors. CHEM 317 (13), 321, 322 (10), 323 (6), 419 (8), and 420 (5) are populated mostly by chemistry majors.
E. Expected proficiency level and proportion of students who should reach this level.
50+%ile on the corresponding ACS exam.
F. Assessment results and number of students who met proficiency level.
CHEM 121 fall (10 out of 16); 121 spring (23 out of 32); 122 fall (23 out of 32); 122 spring (13 out of 21); 301 fall (25 out of 31); 301 spring (13 out of 26); 302 fall (9 out of 11); 302 spring (21 out of 31); 311 (4 out of 6); 317 (10 out of 13); 321 (3 out of 4); 322 (7 out of 10); 411 (10 out of 15); 412 (7 out of 8); 419 (8 out of 8); 420 (5 out of 5)

G. Describe what results indicate about student performance.
Courses populated mostly by chemistry majors had approx. 84% success rate (ABC) for students). The minimum ABC percentage for these courses (317, 321, 322, 419, and 420) was 70.0% in CHEM 322. Courses populated mostly by a mix of majors and non-majors, the success rate was approx. 71%. The minimum ABC rate in these courses (121, 122, 301, 302, 311, 411, and 412) was 66.7%, tied in CHEM 301, 311, and 411.
H. Describe program level changes/ improvements planned for AY 2025-2026 informed by this assessment.
Plan to develop a more narrow and specific program to assess selective objectives.

Enter Table II AY 2025 Assessment Comments Below