

REPORT ON AY2022-2023 ACADEMIC ASSESSMENT**Submission date:** 11/14/2023**Assessment Plan covered in the report:** Chemistry BS**College:** College of Arts and Sciences**Campuses where the program(s) is delivered:** ☒ Anchorage ☐ KOD ☐ KPC ☐ MSC ☐ PWSC**Submitted by:** Debora Sumers, Term Instructor, Chemistry

After responding to the questions below, the program should email this form to the dean, with a copy to the appropriate community campus director(s) if the program is delivered on a community campus.

- 1. Please list and number the Program Student Learning Outcomes your program assessed in AY23. For each outcome, indicate one of the following: Exceeded faculty expectations, Met faculty expectations, or Did not meet faculty expectations.**

Example: 1. Communicate effectively in a variety of contexts and formats – Exceeded faculty expectations.

SLO #1: Understand and critically solve problems related to Physical and Natural Sciences and present those solutions for the advancement of knowledge in the field of Chemistry and Biochemistry. - Met faculty expectations.

SLO #2: Design and conduct experiments that include fieldwork, laboratory analyses, instrumental methods, theoretical development and interpretation in the discipline. - Met faculty expectations.

- 2. Describe your assessment process in AY23 for these Program Student Learning Outcomes, including the collection of data, analysis of data, and faculty (and other, e.g., advisory board) conversations around the findings. (1000 words or less)**

The methodology employed remained largely consistent with previous years, ensuring a reliable and comprehensive evaluation of grading data and program performance.

An analysis of the composite distribution of grades for all academic credit chemistry courses at the UAA Anchorage campus during the Academic Year 2022-2023 (AY 22-23) was conducted and compared to a 3-year running average (FA 20 - SU 23). The data provides insights into the overall performance of students in the program, with a focus on the DFW rates and grade distribution trends.

Additionally, a separate analysis was conducted for chemistry majors to gain a deeper understanding of their academic outcomes.

Grade data were provided by Anita Franciosi and compiled by Debora Summers in Excel (Office 2019) and JMP 17 (SAS Institute). Ms. Franciosi was able to pull the data in TOAD.

The assessment process for the academic year 2022-2023 maintained a consistent and effective methodology, combining data-driven analysis with collaborative discussions among faculty members during faculty meetings, with invitations extended to all faculty members. In addition, the inclusion of individual conversations throughout the year added a personalized dimension to the assessment, recognizing the unique contributions and challenges faced by each faculty member. These interactions provided a valuable opportunity for a nuanced examination of program efficacy.

3. What are the findings and what do they tell the faculty about student learning in your program? (1000 words or less)

The Chemistry Department has long prioritized the assessment of student grades, with a specific emphasis on DFW rates across the curriculum. The primary objective has been to identify improvement opportunities and ensure continuous academic progress.

The composite distribution of grades (N=1277) assigned for all academic credit chemistry courses (UAA Anchorage campus) during AY 22-23 were inspected, removing instances of non-letter grade designations. The data indicate a DFW rate of 29.3%, with rates of A's, B's, and C's at 28.0, 24.2, and 18.0% respectively. This was compared to a 3-year rolling average, of 27.9% DFW with 30.3, 24.7, and 17.2% for A's, B's, C's respectively, revealing a slight increase in the DFW rate from 27.9% to 29.3%. However, the distribution of A's, B's, and C's remained relatively consistent, with a minor decrease in A's and C's and a slight increase in B's.

In addition, the composite distribution of grades (N=94) assigned for all academic credit chemistry courses (UAA Anchorage campus), focusing on chemistry majors only, during AY 22-23 were inspected, removing instances of non-letter grade designations. The data indicate a DFW rate of 11.7%, with rates of A's, B's, and C's at 59.6, 20.2, and 8.5% respectively. This was compared to a 3-yr rolling average of 14.6% DFW with 62.8, 13.7, and 8.9% for A's, B's, C's respectively. A notable improvement was observed in the DFW rate, which decreased from 14.6% to 11.7%. Additionally, there was a significant increase in the proportion of A's, while B's and C's remained relatively stable.

The consistent distribution of A's, B's, and C's indicates stability in student achievement. The notable decrease in the DFW rate for chemistry majors is a positive trend, signaling improved academic success within this subgroup. The significant increase in A's among chemistry majors suggests that major-specific interventions or teaching methodologies may be positively impacting their learning outcomes.

4. Based on the findings, did the faculty make any recommendations for changes to improve student achievement of the Program Student Learning Outcomes? Select Yes or No.

- i. Please describe the recommended action(s), what improvements in student learning the program hopes to see, the proposed timeline, and how the program will know if the change(s) has worked. If no recommendations for changes were made, please explain that decision. (1000 words or less)**

Our recommended actions include:

- Conduct a comprehensive curricular revision, introducing tracks, without the need for additional classes or changes in graduation requirements.
- Shift to Open Educational Resources (OER) in O-Chem, a move that aligns with the department's commitment to accessible and cost-effective educational materials.
- Implement or enhance low-stakes assessments in 100-level courses.
- Pilot a program for test remediation in 100-level courses to explore ways of supporting students who may need additional assistance after assessments.

We hope to see improvements in student learning by:

- Enhanced customization.
- Increased access to learning materials
- Fostering continuous learning and providing students with regular opportunities for self-assessment and improvement.
- Supporting struggling students without compromising academic rigor.

Proposed Timeline:

- We will assess the impact of tracks, once implemented, on an annual basis.
- Conduct informal semester reviews of the transition to OER in O-Chem and the impact of low-stakes assessments on student learning outcomes.
- Evaluate the effectiveness of the test remediation pilot at the end of the academic year.

Success will be measured by:

- Analyzing academic performance data, comparing outcomes before and after the implemented changes to identify trends and improvements.
- Monitoring retention rates, particularly in 100-level courses, to assess whether the introduction of low-stakes assessments and test remediation has positively impacted student persistence.
- Seeking input from faculty regarding the effectiveness of the changes, including any observed improvements in student engagement and success.

5. In the past academic year, how did your program use the results of previous assessment cycles to make changes intended to improve student achievement of the Program Student Learning Outcomes? Please check all that apply.

- ☒ Course curriculum changes
- ☐ Course prerequisite changes
- ☒ Changes in teaching methods
- ☐ Changes in advising
- ☐ Degree requirement changes
- ☐ Degree course sequencing
- ☐ Course enrollment changes (e.g., course capacity, grading structure [pass/fail, A-F])
- ☐ Changes in program policies/procedures
- ☐ Changes to Program Student Learning Outcomes (PSLOs)
- ☒ College-wide initiatives (e.g., High-Impact Practices)
- ☒ Faculty, staff, student development
- ☐ Other
- ☐ No changes were implemented in AY23. *(If no options above were selected)*

If you checked "Other" above, please describe. (100 words or less)

6. Do you have any information about how well these or other past improvements are working? Are they achieving their intended goals? Please include any data or assessment results that help you demonstrate this. (1000 words or less)

Dr. Zac Redman implemented two notable changes in the instructional approach for General Chemistry II. Firstly, modifications were made to the lecture format to integrate group work with immediate feedback. This adjustment not only fostered the formation of study groups among students but also resulted in extensive participation. Furthermore, Dr. Redman underscored the correlation between homework completion rates and exam scores, thereby promoting a proactive approach to homework. Collectively, these teaching method adaptations contributed to a reduction in the bimodal grade distribution, attributed to heightened engagement with homework assignments and increased participation in group work.

Furthermore, the ongoing review of the implementation of high-frequency assessments, aligning with a college-wide initiative, is currently underway across various courses. Preliminary feedback, both from students and faculty, has been overwhelmingly positive, suggesting a favorable reception of this pedagogical approach.

DEAN SECTION (Due to the program on January 15)

After completing the Dean Section and signing it, the dean should email this form to the program, and copy uaa_ooo@alaska.edu for posting. If the program is delivered on one or more community campus, the dean should consult with the appropriate community campus director(s) on the response and copy the appropriate community campus director(s) when emailing the response to the program.

1. Based on the program's responses above, what guidance and support do you have for the program moving forward? (200 words or less)

I encourage the department to implement some of the changes it recommends in introductory courses in question 4. For example, the in-class study groups, the high frequency class assessments, and more active learning may impact SLOs and consequently also improve DFW rates (for majors and non-majors alike). These initiatives should be assessed in upcoming reports for effectiveness.

2. Discuss what the program is doing particularly well in terms of its processes for the assessment and improvement of student learning, for example, the use of a common rubric or prompt, a signature assignment, etc. (200 words or less)

As a result of this assessment activity, the faculty in the program had valuable discussion regarding the teaching of Chemistry. These conversations led to many suggestions to improve the curriculum and have led to lower DFW rates for the major. Their thoughtful approach to assessment is appreciated.

Dean's signature:

Jenny McNulty

Date: 1/12/2024