SAINT LOUIS UNIVERSITY.

Program-Level Assessment: Annual Report

Program Name (no acronyms): Chemistry PhD	Department: Chemistry
Degree or Certificate Level: Graduate	College/School: Science & Engineering
Date (Month/Year): September 2022	Assessment Contact: Marvin Meyers

In what year was the data upon which this report is based collected? 2021-2022

In what year was the program's assessment plan most recently reviewed/updated? 2018

Is this program accredited by an external program/disciplinary/specialized accrediting organization? No

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle? (Please list the full, complete learning outcome statements and not just numbers, e.g., Outcomes 1 and 2.)

This is Year 2 of a three year cycle. The following Outcomes were evaluated according to the program assessment plan.

Outcome 1: Demonstrate advanced level knowledge in both (i) synthesis and materials chemistry and (ii) analytical and physical chemistry methods, with a higher level of knowledge expected in the student's area of focus.

Outcome 2: Use standard search tools and retrieval methods to obtain information about a topic, substance, technique, or an issue relating to chemistry and assess relevant studies from the chemical literature.

Outcome 3: Communicate scientific findings from literature and original findings from the student's own advanced research in written publications and oral presentations.

Outcome 4: Apply learned chemical practices and theories to proposed problems.

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please describe the artifacts in detail and identify the course(s) in which they were collected. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

For Outcome 1, using a scale of 1 to 4 (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent), rubrics on the student's "Mastery of Chemical Concepts and Knowledge of the Chemical Literature" for the 2nd year update and "Background Knowledge" for the PhD research proposal were used.

For Outcome 2, the overall score out of 100 points on a rubric for the research paper from CHEM 5470 Medicinal Chemistry was used. Criteria used for assessment was as follows:

>90% Exceeds expectations

70 - 89% Meets expectations

65 - 69% Approaching expectations

<65% Not meeting expectations

For Outcome 3, using a scale of 1 to 4 (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent), the overall score on a rubric for the oral 4th year seminar presentation was used.

For Outcome 4, using a scale of 1 to 4 (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent), the overall score on the rubric for the PhD research proposal was used.

No courses were offered online. Madrid does not have a graduate program in Chemistry.

3. Assessment Methods: Evaluation Process

What process was used to evaluate the artifacts of student learning, and by whom? Please identify the tools(s) (e.g., a rubric) used in the process and **include them in/with this report document** (please do not just refer to the assessment plan).

Rubrics were used for all 4 artifacts. These were completed by instructors for course work (Outcome 2), PhD research mentors (Outcomes 1 and 4), and the graduate program director (Outcome 3).

4. Data/Results

What were the results of the assessment of the learning outcome(s)? Please be specific. Does achievement differ by teaching modality (e.g., online vs. face-to-face) or on-ground location (e.g., STL campus, Madrid campus, other off-campus site)?

For Outcome 1, using a scale of 1 to 4 (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent), rubrics on the student's "Mastery of Chemical Concepts and Knowledge of the Chemical Literature" for the 2nd year update were used.

Individual student scores collected = 2,3,4,4,4,4. Avg = 3.5. Median = 4.

For Outcome 1, using a scale of 1 to 4 (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent), rubrics on the student's "Background Knowledge" for the PhD research proposal were used.

Individual student scores collected = 3,3,3,4,4. Avg = 3.4. Median = 3.

Assessment of Outcome 1: Nearly all of our students are meeting or exceeding expectations, with the exception of 1 student out of 11 which had an assessment of "fair" on Mastery of Concepts and Knowledge as an early second year student. As part of our graduate program, weaknesses in students knowledge identified at this stage are identified by the committee and recommendations are provided for improvement. After such students complete their second year, they take comprehensive exams which assess core knowledge. All the students passed their comprehensive exams from this cohort.

For Outcome 2, the overall score out of 100 points on a rubric for the research paper from CHEM 5470 Medicinal Chemistry was used. Criteria used for assessment was as follows based on the final score in each class:

	>90% Exceeds expectations	70 - 89% Meets expectations	65 - 69% Approaching expectations	<65% Not meeting expectations
Total number in category	7	4	0	0

Assessment of Outcome 2: All of the students taking this course met or exceeded expectations.

For Outcome 3, communication of scientific findings from the oral 4th year seminar presentation was evaluated using the overall score on the rubric.

Student	Presentation Skills	Demonstrate advanced knowledge in research area	Communicate chemical topics effectively
1	4	3	4
2	3	3	3
3	3	3	3
4	2	3	2
5	4	4	4
6	3	3	3

Assessment of Outcome 3: Of the 6 students assessed, 5 met or exceeded expectations. 1 student received "fair" scores. Such students are encouraged to present their research in additional forums to gain experience communicating their results.

For Outcome 4, using a scale of 1 to 4 (1 = Poor, 2 = Fair, 3 = Good, 4 = Excellent), the overall score on the rubric for the PhD research proposal was used.

Student	Format	Aims	Background	Approach	Progress	Written	Oral
1							
2	4	3	4	4	4	4	4
3	4	4	4	4	4	4	4
4	3	3	3	3	3	3	3
5	4	3	3	4	3	3	4
6	4	4	3	4	NR	4	4

NR = not reported

Assessment of Outcome 4: All students received good and excellent scores, thereby meeting or exceeding our expectations.

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you?

Overall, our PhD students are meeting or exceeding expectations for the assessed outcomes. These findings indicate we are admitting students who are prepared to handle the challenges of our advanced coursework and conduct research in our labs. They are applying their knowledge to problems posed in their coursework and are doing so successfully. Based on our analysis, we would recommend graduate mentors to identify gaps in knowledge of their students and provide opportunities to fill these gaps as well as to provide opportunities to practice formal presentations in front of their groups and/or conference settings.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

A. When and how did your program faculty share and discuss these results and findings from this cycle of assessment?

The results and findings were communicated by email and discussed in our dept administrative meeting.

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies
- Course content
- Teaching techniques
- Improvements in technology
- Prerequisites
- Course sequence
- New courses
- Deletion of courses
- Changes in frequency or scheduling of course offerings

Changes to the Assessment Plan
- Student learning outcomes
- Artifacts of student learning
- Evaluation process
- Evaluation tools (e.g., rubrics)
- Data collection methods
- Frequency of data collection

Please describe the actions you are taking as a result of these findings.

We will continue to improve our advising and mentoring of graduate students to maintain our high level of student performance, particularly as they progress through our program. We are also currently reviewing our overall program structure to determine if any changes can or should be made.

If no changes are being made, please explain why.

N/A

7. Closing the Loop: Review of Previous Assessment Findings and Changes

A. What is at least one change your program has implemented in recent years as a result of assessment data?

We have not made any specific changes to our program as our assessment data consistently shows that our students are meeting and exceeding expectations on our outcomes.

B. How has this change/have these changes been assessed?

N/A

C. What were the findings of the assessment?

N/A

D. How do you plan to (continue to) use this information moving forward?

We will continue to monitor the progress of our students and as areas of concern arise, we will made adjustments to address issues.

Rubrics used for graduate program assessments:

2nd Year Update Rubric: https://docs.google.com/document/d/1RXVwF5b-nRw5W6gkfeOYZf2s9MVFjuR1/edit?usp=sharing&ouid=115269951254626488709&rtpof=true&sd=true

Research Proposal Rubric:
https://docs.google.com/document/d/1sao9w4-RNLu2TIdYU_ku49CDvKH6krlj/edit?usp=sharing&ouid=115269951254626488709&rtpof=true&sd=true

PhD 4th Year Seminar Rubric:
https://docs.google.com/document/d/1SwmpoK4W_K6wsW4s7HCAsMGFYnlRmnt0/edit?usp=sharing&ouid=115269951254626488709&rtpof=true&sd=true

PhD Dissertation Rubric:
https://docs.google.com/document/d/1LTOjl3Bur7KsNUMq6U5hEmxab0lRWeg3/edit?usp=sharing&ouid=115269951254626488709&rtpof=true&sd=true

PhD Final Defense Rubric:
https://docs.google.com/document/d/1k-ojRUTjDM5hr_qS0p6c95NoGL8hHuBa/edit?usp=sharing&ouid=115269951254626488709&rtpof=true&sd=true

CHEM 5470 Medicinal Chemistry Research Paper Rubric:
https://drive.google.com/file/d/1COLIqVK9SpH9bx0PrwHPuQdiuOgqJ3Wt/view?usp=sharing