

II. SUMMARY OF ASSESSMENT

BS/BA Programs

A. Program Learning Outcomes

Program Learning Outcomes (PLO) for BS/BA Chemistry and BS/BA Biochemistry:

1. Demonstrate knowledge in the various areas of chemistry, including inorganic chemistry, analytical chemistry, and organic chemistry (ILO 1 & 6).
Effectively and safely in a laboratory environment to perform experimental procedures and use modern chemical/biochemical instruments (ILO 6).
Plan, carry out, record and analyze the results of chemical/biochemical experiments (ILO 6).
Communicate chemical and biochemical issues clearly (ILO 2 & 6).

B. Program Learning Outcomes Assessed

BS/BA Programs: Based on our long-term curriculum assessment plan, the assessment focus of the academic year 2021-2022 is PLO 4. Data for assessment were collected from 3 classes: Chem 332 (Organic Chemistry II), Chem 320 (Bioanalytical and Forensic Instrumentation), and Chem 420 (Instrumental Analysis).

Instrument: Submitted work (exams and assignments) by students.

Sampling Procedure: All submitted work.

Sampling Characteristics: Written products (lab reports or written exams).

Data Collection: The data was collected in Fall 2021 and Spring 2022.

Data Analysis: The submitted work was assessed for learning mastery by the instructor-in-charge.

C. Summary of Assessment Results

Main Findings

- Chem 332 (Organic Chemistry II):** data collected was from a capstone laboratory experiment in Spring 2022. The students demonstrated the ability to utilize known chemical concepts in the laboratory. The submitted written lab reports and data tables of experiment recording and analysis were used to

	# of students	Both correct	At least one correct	None correct	% Both correct	% One or more correct
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did not have the opportunity to attend lab sessions in-person as freshmen and sophomores. We plan to address this by providing more detailed and thorough introduction into laboratory work, which will hopefully lead to a higher number of students achieving the learning objectives.

D. Assessment Plan for Next Year

For the coming year, we plan to assess PLO 5 (communicate chemical and biochemical issues clearly) which aligns with ILO 2 & 6 (Written Communication and Specialized Discipline, respectively) using the data collected in Chem 320 (Bioanalytical and Forensic Instrumentation), Chem 420 (Instrumental Analysis), and Chem 443 (Biochemistry Lab I). To assess the level of mastery, we will implement the ILO written communication rubric.

Masters Program

A. Program Learning Outcomes

Students graduating with a Master of Science in Chemistry will be able to:

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Aenc 3 (i)-p6 (t)-6en Cz (c)-6ed k6 (2.8 (nobe abl)2 Tw 32.4d.6 (i)2.66 (i)2.6 (-2 3a 6.6

This course covers quantum chemistry and Group Theory. The course is assessed using embedded exam questions over several exams. 19 students completed this course. All of the students were in the MS – Chemistry program.

Exam I – Quantum Basics

Minimum Percentage	Number of Students
100%	15
75%	17
50%	19
25%	19

Exam II – Rotational and Vibrational Structure

Minimum Percentage	Number of Students
100%	

Reflections and Recommendations for closing the Loop

Students did very well in the course, with no one earning a final grade lower than B+. Overall, the area with the largest potential for improvement (although it is still a small potential) is Electronic Structure. Students struggled (again, this is a relative term, as most of the “struggles” were minor) with some of the quantitative aspects of quantum theory and spectroscopy as applied to atomic systems. In future iterations of the course, more examples and worked problems will be covered and assigned to support learning in these areas.

D. Assessment Plan for Next Year

Next year, we plan to assess PLO 2: work effectively and safely in a laboratory environment using chemistry laboratory techniques and chemical/biochemical instrumentation.