

**CSU CHICO**  
ASSESSMENT SUMMARY UPDATE

PROGRAM: BS in Biochemistry

Year of review	Student Learning Outcome	Describe assessment activity done this year for this SLO	Findings	Based on the results or evidence, what action was taken regarding program improvements?
2016-2017	Students achieve proficiency in the understanding of chemical theory	A standardized American Chemical Society (ACS) one-semester Inorganic Chemistry exam (Form 2009) was used as the final exam in CHEM 361. This Inorganic Chemistry course is taken by our three majors: Chemistry (BS), Chemistry (BA), and Biochemistry (BS).	Results indicated that 38% of the Fall 2016 students had "mastered" Outcomes A, B, & C, and 68% had "practiced" Outcomes A, B, & C. Results by topic for the exam indicated that two topics, "solids" and "geometry", appeared more problematic than other topics for Fall 2016 students.	None
2015-2016	Students achieve proficiency in quantitative analysis of experimental data	Embedded assessment was carried out in one CHEM course that spanned our three majors: Chemistry (BS), Chemistry (BA), and Biochemistry (BS)	The sample consisted of 37 total students from two sections of CHEM 320. Students were assessed for their proficiency in analyzing experimental results and categorizing data statistically using computer technology. The assessment was made using data from their final six experiments in CHEM 320. CHEM (BA+BS) majors had the greatest percentage of students achieving the measure. This result suggests that CHEM (BA+BS) majors were more proficient in analyzing experimental results and categorizing data statistically using computer technology. While this statement appears true for the time frame assessed, much more data is needed before any generalizations can be made.	None

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2014-2015	Students achieve proficiency in quantitative analysis of experimental data	Embedded assessment was carried out in one CHEM course that spanned our three majors: Chemistry (BS), Chemistry (BA), and Biochemistry (BS)	The sample consisted of 16 total students [3 CHEM (BS) majors & 13 BIOC (BS) majors] from two sections of CHEM 320 (Table 5). Students were assessed for their proficiency in the quantitative analysis of experimental data, specifically their ability to be accurate and precise. The assessment was made using data from their final experiment in CHEM 320. As shown in Table 5, all of the CHEM (BS) majors achieved satisfactory accuracy and precision scores, while only 54% of the BIOC (BS) majors were able to do so. This result suggests that CHEM (BS) majors were more proficient in the quantitative analysis of experimental data than BIOC (BS) majors. While this statement appears true for time frame assessed, much more data is needed before any generalizations can be made.	Two particularly problematic areas for nearly all of the Spring 2015 BIOC (BS) students included questions relating to "Sanger DNA Sequencing (analysis using gel electrophoresis)" and "Multiple Sequence Alignments", which are CHEM 452 and CHEM 451 related topics respectively. This data was the inspiration for implementing a BIOC (BS) program improvement, specifically in CHEM 451. In the CHEM 451 course taught by Dr. Dan Clark this semester (Fall 2016), he implemented a requirement that all students perform a multiple sequence alignment using the program BioEdit, and interpret the data, as part of a graded assignment. It is anticipated that this assignment will enhance student understanding of multiple sequence alignments
2013-2014	Students will have a good understanding of the theories of inorganic chemistry, organic chemistry, physical chemistry, analytical chemistry, and biochemistry.	Embedded assessment was carried out in 2 different CHEM courses that spanned our three majors: Chemistry (BS), Chemistry (BA), and Biochemistry (BS)	In CHEM 370, CHEM (BS) and BIOC (BS) students were assessed for their understanding of the theories of organic chemistry. The results indicated that 50% of the CHEM (BS) majors and 88% of our BIOC (BS) majors in this course had a good understanding of organic chemistry. There were no CHEM (BA) students in this course. In	None

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			CHEM 452, BIOC (BS) students were assessed for their understanding of the theories of biochemistry. National averages for the 2012 standardized exam were not available at the time this report was submitted. Therefore no conclusions could be drawn from this year's data.	
2012-2013	Students will have a good understanding of the theories of inorganic chemistry, organic chemistry, physical chemistry, analytical chemistry, and biochemistry	Embedded assessment was carried out in 2 different CHEM courses that spanned our three majors: Chemistry (BS), Chemistry (BA), and Biochemistry (BS)	Our CHEM (BS) and BIOC (BS) students were assessed for their understanding of the theories of organic chemistry. The results indicated that the majority (60%) of our CHEM (BS) majors have a good understanding of organic chemistry. By way of contrast, the results indicated that only 27% of our BIOC (BS) majors appear to have a good understanding of organic chemistry. Whether this is a trend or not remains to be seen with future assessments. Our CHEM (BA), CHEM (BS), BIOC (BS) students were assessed for their understanding of the theories of biochemistry. National averages for the 2012 standardized exam were not available at the time this report was submitted. Therefore no conclusions could be drawn from this year's data. The total number of students in this assessment was very small and this has made the interpretation of the results problematic and speculative. It is expected that as we move toward an annual	None

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			assessment of all SLO' in the future, the accumulation of multi-year data will be much more informative.	