

**Assurance of Student Learning
2019-2020**

Ogden College of Science and Engineering

Chemistry Department

Chemistry BS (623)

Use this page to list learning outcomes, measurements, and summarize results for your program. Detailed information must be completed in the subsequent pages.

Student Learning Outcome 1: Our graduates will have the ability to communicate effectively in written form.

Instrument 1 | Laboratory reports from CHEM 451 (Physical Chemistry Lab)

Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 1.

Met

Not Met

Student Learning Outcome 2: Our graduates will have the ability to read and interpret data about chemical systems.

Instrument 1 | American Chemical Society Exam in Analytical Chemistry

Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.

Met

Not Met

Student Learning Outcome 3: Our graduates will have an understanding of structure-property-function relationships for a variety of molecules.

Instrument 1 | American Chemical Society Exam in Organic Chemistry

Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.

Met

Not Met

Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)

1. Rubric for lab reports is being evaluated and refined to reflect input from multiple faculty evaluators.
2. Content reviews provided to students are being refined as more data from the question analysis is collected.

Student Learning Outcome 1

Student Learning Outcome	Our graduates will have the ability to communicate effectively in written form.		
Measurement Instrument 1	<p>Laboratory reports from CHEM 451 (Physical Chemistry Lab) The lab report for the Crystal Violet (CVL) and Adiabatic Expansion (AEL) Laboratories were chosen, as it requires students to collect and analyze data and report on the results of the experiment in a clear fashion. Students are expected to analyze the data and arrive at accurate (reasonable) conclusions from this data. They are further required to communicate these results in a clear and effective way in scientific writing. The CVL is performed early in the semester and the AEL is performed later in the term. The instrument was assessed in a fashion consistent with the Written Communication VALUE Rubric from AAC&U. Basic parameters for Context, Content, Conventions, Sources, and Syntax were rated on the 1 to 4 scale.</p>		
Criteria for Student Success	Students should score at average numerical ranking of 2.6 or higher on the 4-level scale of the rubric. For the CVL, overall scores ranged from 1.6 to 4 with an average and median of 2.9. For the AEL, overall scores ranged from 2.4 to 4 with an average of 3.2.		
Program Success Target for this Measurement	75%	Percent of Program Achieving Target	75% for CVL 85% for AEL
Methods	All 27 students in CHEM 451 course in 2019-2020 were scored on this lab report. The reports were all assess/rated by the instructors of record of the course for Fall 19 and Spring 20.		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.			Met
Not Met			
Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)			
The range of student abilities was very broad and highlights the need for a clearer set of guidelines and expectations for report writing. A training session for students was provided for the students in which they were given two sample reports. Report 1 was a Low Score example and Report 2 was a Hi Score example. Students were asked to determine the errors made in Report 1 and discuss them in a lab meeting during the first 25% of the semester. The training sessions will continue in order to collect additional student data.			
Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)			
The rubric will be evaluated and refined for appropriateness for scientific writing and additional faculty will be involved in future rounds of scoring these reports.			

Student Learning Outcome 2

Student Learning Outcome	Our graduates will have the ability to read and interpret data about chemical systems.		
Measurement Instrument 1	American Chemical Society Exam in Analytical Chemistry This is a nationally-normed 50-question multiple choice exam given at the conclusion of the CHEM 330 (Quantitative Analysis) course (required of all majors and minors).		
Criteria for Student Success	50%-tile ranking or higher		
Program Success Target for this Measurement	50% of students taking the exam	Percent of Program Achieving Target	57%
Methods	This exam was not taken by all students in the course. Those who were already at a grade criteria above an A were allowed to opt out of the exam.		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.		Met	Not Met
Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)			
<p>Course content is being evaluated in the context of exam topics. This exam is made available in an updated version approximately every two years. This update cycle allows the exam to reflect the current topical content recommended by the exam committee.</p> <p>A question level analysis was completed for the Fall 2019 semester. Some topical coverage was adjusted (extended lecture time, additional examples or problem sets) to better reflect current content. The changes will be continued for the Fall 2020 semester in order to collect more data on student performance.</p>			
Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)			
Students will be provided with a content review opportunity near the end of the semester. Choice of content will be guided by topics identified from both the question-level analysis of prior terms' exam results and from student requests.			

Student Learning Outcome 3

Student Learning Outcome	Our graduates will have an understanding of structure-property-function relationships for a variety of molecules.				
Measurement Instrument 1	American Chemical Society Exam in Organic Chemistry This is a nationally-normed 50-question multiple choice exam given at the conclusion of the CHEM 342 (Organic Chemistry 2) course.				
Criteria for Student Success	50%-tile ranking or higher				
Program Success Target for this Measurement	50% of students taking the exam	Percent of Program Achieving Target	46%		
Methods	This exam was taken by all students in the course.				
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.			<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">Met</td> <td style="text-align: center;">Not Met</td> </tr> </table>	Met	Not Met
Met	Not Met				
Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)					
<p>Course content is being evaluated in the context of exam topics. This exam is made available in an updated version approximately every two years. This update cycle allows the exam to reflect the current topical content recommended by the exam committee.</p> <p>A question level analysis was completed for the Fall 2019 semester. Some topical coverage was adjusted (extended lecture time, additional examples or problem sets) to better reflect current content. The changes will be continued for the Fall 2020 semester in order to collect more data on student performance.</p>					
Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)					
<p>Students will be provided with a content review opportunity near the end of the semester. Choice of content will be guided by topics identified from both the question-level analysis of prior terms' exam results and from student requests.</p> <p>The percentage of students meeting the "program success target" increased from 38% (AY 18/19) to 46% (AY 19/20). Additional analysis will be conducted on the Fall 2020 semester results to investigate student misconceptions.</p>					