

COURSE SLO ASSESSMENT REPORT, SCC

Department: ___Chemistry_____ Course: ___Chem 229_____

Year: ___2013_____ Semester: ___Fall_____

1) Outcome to be assessed	1 - Identify the essential parts of a problem and apply known chemical concepts in solving the problem.												
2) Means of assessment and criteria of success	To assess SLO#1, we have administered the standardized exam for the year long course of general chemistry provided by the American Chemical Society. The national norm (50 th percentile) calculated by the American Chemical Society determines the passing score for this version of the exam is 42/70, and will therefore be considered meeting the standard.												
3) Summary of data collected	<p>At the end off the Fall semester, the ACS standardized exam was administered for 2 sections of Chemistry 229. The total number of students who took the exam was 34. The class averages were 43.1 (19 students) and 45.4 (15 students) of correct answers. 21 out of 34 students taking the exam met or exceeded the national average score. Based on this criterion 62% of the students completing Chem 229 successfully completed SLO#1.</p> <p>Break down of overall scores is as follows:</p> <table data-bbox="325 1047 598 1258"><thead><tr><th><u>Score</u></th><th><u># students</u></th></tr></thead><tbody><tr><td>60-70</td><td>1</td></tr><tr><td>50-59</td><td>7</td></tr><tr><td>40-49</td><td>17</td></tr><tr><td>30-39</td><td>9</td></tr><tr><td>0-29</td><td>0</td></tr></tbody></table> <p>We ran the analysis of the answers of the individual exam questions; the data and analysis can be seen below:</p>	<u>Score</u>	<u># students</u>	60-70	1	50-59	7	40-49	17	30-39	9	0-29	0
<u>Score</u>	<u># students</u>												
60-70	1												
50-59	7												
40-49	17												
30-39	9												
0-29	0												

question #	# of incorrect answers	% of students incorrect	topic covered	student raw ACS exam scores
1	4	12		34
2	12	35		34
3	17	50		40
4	25	74	quantum numbers*	41
5	0	0		43
6	0	0		43
7	14	41		44
8	1	3		45
9	11	32		46
10	5	15	Lewis structures*	46
11	10	29		47
12	1	3		51
13	9	26		53
14	10	29		55
15	16	47		59
16	7	21		60
17	3	9		54
18	3	9		34
19	6	18		40
20	19	56	net ionic equations	49
21	15	44		33
22	15	44		36
23	9	26		37
24	20	59	gas stoichiometry	34
25	3	9		59
26	14	41	enthalpy - Hess' law*	44
27	9	26		40
28	15	44		49
29	9	26	entropy*	30
30	1	3		33
31	17	50		48
32	13	38	enthalpy - of formation*	51
33	10	29		45
34	16	47		43
35	3	9		44.11764706
36	7	21		

***did not include exams from 2 students caught cheating**

21 out of 34 passing

37	12	35	
38	16	47	ionic vs covalent character*
39	17	50	
40	16	47	
41	17	50	
42	19	56	kinetics (rate law)
43	12	35	
44	9	26	
45	8	24	
46	15	44	reaction rate*
47	22	65	rate constant*
48	21	62	kinetics
49	19	56	equilibrium*
50	10	29	
51	9	26	
52	25	74	solubility*
53	21	62	buffer*
54	21	62	Ksp*
55	19	56	titration curve
56	19	56	pH
57	2	6	
58	19	56	redox
59	9	26	
60	23	68	redox*
61	15	44	
62	13	38	
63	5	15	
64	22	65	electrochem*
65	2	6	
66	20	59	ionic radius*
67	17	50	
68	13	38	
69	16	47	
70	28	82	ionization energy*

Chem 229 material

* missed in F12

4) Analysis of data	<p>From data analysis and looking at topics covered on the questions missed by the majority (over 50%) of the students taking the standardized ACS exam, 9 of 17 questions were from Chem 229, the others were topics covered in first semester general chemistry (Chem 219). Of the questions from topics covered in Chem 229, students appear to have deficiencies in equilibrium, acid-base titration curves, solubility and electrochemistry (including oxidation-reduction reactions). In comparison to the previous year's assessment, there was an improvement in the areas of entropy and enthalpy.</p>
5) Plan of action/what to do next	<p>The SLO was not achieved as only 21 (62%) of the students scored the national average of above on the ACS exam.</p> <p>Our class average in both sections is above the national average on the ACS exam. That shows that we have a strong curriculum in the yearlong sequence of General Chemistry (Chem 219 & Chem 229). However, we will continue to improve on "hands on" laboratory experiments covering the Chem 229 material and set up reviews of the first semester material to help the students retain the material for the cumulative assessment.</p> <p>We may want to look at only the material from Chem 229 and not the cumulative year of General Chemistry as we are getting more and more students that have either taken Chem 219 at other institutions and/or it has been several years between Chem 219 and Chem 229; to assess a single class using an exam covering two classes may not be fair.</p>

COURSE SLO ASSESSMENT REPORT, SCC

Department: Chemistry Course: Chem 229

Year: 2013 Semester: Fall

*1) Outcome to be assessed	2 - Write in scientific terms and explain observed scientific phenomenon using the language of chemistry. 3 - Act with experimental competency, collect and analyze data, identify sources of error and interpret laboratory result.												
2) Means of assessment and criteria of success	To assess SLOs #2 & 3 we assigned a lab final project consisting of the identification of 2 unknown aqueous inorganic samples, each containing 1-5 cations (This is a change in the project/procedure since the last SLO analysis). The project is based on the experiments performed throughout the semester and uses the lab notes/observations the students have taken. A score of 70% or better is considered meeting the standard.												
3) Summary of data collected	<p>The last 5 weeks of the semester was spent performing the final project in lab. The project was completed by 2 sections of Chem 229, a total of 37 students. The average score on the project was 67% (60% and 71%) with only 16 out of the 37 students completing the project passing the assessment with a grade of 70% or better. Based on this criterion, 43% of the students completing Chem 229 were successful in completing SLOs 2 & 3.</p> <p>Break down of overall scores is as follows:</p> <table data-bbox="436 964 709 1179"><thead><tr><th><u>Score</u></th><th><u># students</u></th></tr></thead><tbody><tr><td>90-100</td><td>10</td></tr><tr><td>80-89</td><td>1</td></tr><tr><td>70-79</td><td>5</td></tr><tr><td>60-69</td><td>5</td></tr><tr><td>0-59</td><td>16</td></tr></tbody></table>	<u>Score</u>	<u># students</u>	90-100	10	80-89	1	70-79	5	60-69	5	0-59	16
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4) Analysis of data	<p>After looking at the break down of individual student scores it appears that the results are bimodal, with the students either being able to correctly identify their unknowns with little to no help, or doing very poorly in the task.</p> <p>As this was the first time running the final project with just cations in the unknown mixtures, it seems we may still have some kinks to workout. There were some cations that were rarely identified correctly by any students in either of the sections.</p>
5) Plan of action/what to do next	<p>We did not meet these SLOs as only 43% of the students achieved 70% or above on the lab final project.</p> <p>From this data, it appears that some of our students are lacking in lab skills, being unable to interpret their observations and compare them to previous results with respect to identifying unknown cations in a solution. For future Chem 229 classes, we will emphasize detailed procedure writing and observation making during the determination of individual group unknowns in order to build confidence and self-reliance in the final unknowns. We are also analyzing the specific ions that seemed problematic and may need to adjust the concentrations in which they are in the unknown solutions.</p> <p>As we have now changed the SLO assessment to include 7 cations and not just 2-3 cations, it makes sense to change our criteria for meeting the SLOs. We will be change the criteria from earning 70% to correctly identifying 4 out of 7 of the cations collectively contained within their two unknown solutions.</p>