

Course or Program Assessment Summary http://academic.cuesta.edu/sloa/docs/Course_and_Program_Assessment_Summary_F_2011.docx

This form can be used to record SLO assessment plans and results for courses or programs. It is recommended that this document be stored on a group drive, or in MyCuesta.

Division: **Physical Sciences** Program: **Chemistry** Date: **August 29, 2014** v. 3 2012

Courses in program, or course: Degree courses: Chem 201A/201B and Chem 212A/212B (Chem 210FAL and Chem 211 also part of discipline)

Faculty involved with the assessment and analysis: **Praveen Babu, Greg Baxley, Lara Baxley Bret Clark, Katherine Jimison, Alex Kahane**

Course-to-program outcome mapping document** is completed Yes No

1	<p>Student Learning Outcome Statements</p> <ul style="list-style-type: none"> ● Program <input type="checkbox"/> Course 	<ol style="list-style-type: none"> 1. Determine the chemical or physical properties of substances based on atomic and molecular structures, orbital theory, the type of chemical bonding, shapes of molecules, and spectroscopic data. 2. Evaluate and interpret numerical and chemical scientific information. 3. Solve problems involving chemical reactions including quantitative calculations, mechanisms, synthetic routes, and product prediction. 4. Communicate chemical concepts through the use of molecular formulas, structural formulas, reaction mechanisms, and names of inorganic and organic compounds. 5. Safely perform laboratory experiments based on gravimetric, volumetric, and instrumental analysis techniques and effectively utilize the appropriate experimental apparatus and technology.
2	<p>Assessment Methods Plan (identify assessment instruments, scoring rubrics, SLO mapping diagrams)</p>	<ol style="list-style-type: none"> 1. Administer SLO self survey at end of term in Chem 201B and Chem 212. (SLOs 1-5) 2. Administer ACS general and organic chemistry exams. (SLOs 1-5) 3. Using simple rubric, determine how many students successfully complete a qualitative analysis scheme (SLO 5, Chem 201B) 4. Future assessment method will include graphing/spreadsheet competency.
3	<p>Assessment Administration Plan (date(s), sample size or selection of course sections, scoring procedures, etc.)</p>	<p>Administer each element of assessment during spring semester (largest number of students enrolled) It is important to assess the PLO in Chem 212 as these are the terminal courses of the Chemistry program. Administer the Chem 212A PLO assessment during fall semester and Chem 212B during spring semester as only one section of each of these courses are offered. 212B offered spring only, last course in program</p>
4	<p>Assessment Results Summary (summarize Data)</p>	<p>Survey data attached. For Sp 2010, 43 of 44 students successfully identified at least 4 of 5 cations. Spring 2011, 52 of 59 students successfully identified at least 4 of 5 cations.</p> <p>Assessment results from American Chemical Society 2 hour general chemistry exam:</p> <ol style="list-style-type: none"> a. Administered at the end of the semester, data is for 2 class sections in Sp 09, a very strong class of 36 students taking the exam b. Mix of conceptual and algorithmic problems c. Class average Spring 09 is 76th percentile, higher than typical range of 70-74 percentile (74 in Sp 07). d. 83% of students above 50th percentile (77% in Sp 07)

		<ul style="list-style-type: none"> e. 19% of students above 90th percentile (14% in Sp 07) f. Data for Sp 2010, class average is 69th percentile (dropping lowest 3 scores raises average to 74th percentile) g. Sp 2010, 25% of students score in 90th percentile or above h. Fall 2011: 18 of 39 above 75th percentile i. Fall 2011: average raw score 43.4 = 72nd percentile j. Fall 2011: 10 of 39 above 90th percentile k. Spring 2012 SLO: 18 of 60 above 90th percentile, average percentile is 76th in SLO l. Spring 2012 NCC: 3 of 17 above 90th percentile, average percentile is 71st m. Spring 2014 combined: average is 44.1, 78th percentile, with 24/71 (34%) above the 90th percentile
5	Discussion of Assessment Procedure and Results, and Effectiveness of Previous Improvement Plans	<p>PLO 1: This outcome is addressed to a significant degree in Chem 201A, and an assessment tool will be developed in Fall 2012 to assess that portion of the program learning outcomes. Assessment in Chem 212A during Fall 2010 and 2011 semesters indicated level of achievement of PLO 1: Very Well 44%, Fairly Well 24%, Somewhat 31%, Slightly or Not at All 1%</p> <p>PLO 2: The ACS general chemistry exam results are used to evaluate this PLO. The data above show that student excel compared to national norms.</p> <p>PLO 3: The ACS general chemistry exam results are used to evaluate this PLO. Data show that Cuesta 201B students do <i>significantly better than average</i> students taking the ACS exam in U.S. Assessment in Chem 212A during Fall 2010 and 2011 semesters indicated level of achievement of PLO 3: Very Well 54%, Fairly Well 24%, Somewhat 17%, Slightly or Not at All 5%. Results of the exam remain strong throughout 2014.</p> <p>PLO 4: This outcome is addressed qualitatively throughout the general chemistry sequence. Students who fail to master this outcome generally do not succeed in this course sequence. The mastery of the outcome is enhanced by routinely expecting students to use proper names of chemical compounds throughout the course. Assessment in Chem 212A during Fall 2010 and 2011 semesters indicated level of achievement of PLO 4: Very Well 42%, Fairly Well 29%, Somewhat 8%, Slightly or Not at All 0%.</p> <p>PLO 5: 80% of students were able to communicate and use appropriate technology in lab via a graphing activity in Chem 201B (spring 2012).</p>
6	Recommended Changes & Plans for Implementation of Improvements	Assessment data shows that a large majority of students achieve the PLOs during their courses in the Chemistry program. Improvements could be in making better use of mastering chemistry to collect outcomes data across section, and to better integrate assessments across all sections. It is important to maintain computer access in the chemistry labs to maintain the high level of technological skills our students currently acquire in the program.
7	Description or evidence of dialog among course or program-level faculty about assessment plan and results	Faculty discussed the results of the ACS exam and the student survey at informal meetings after division meetings in March/April 2012, and in Fall 2012. Chem 212 faculty discussed assessment results in August 2012. Faculty discuss assessment results after the ACS exam is given in spring. Future improvements include using a different data analysis program to better disaggregate results by question type.