

Program Outcomes and Assessment Report

Department: Biology	Degree or certificate title Certificate of Achievement in Biomanufacturing (Math 208, Chem 30A, Bio 3, Bio 75, Bio 76)		Contact: Leslie Blackie lblackie@peralta.edu		Date: 2013-2016				
Program SLOs	ILO	Which courses and assignments address each program SLO?	Assessment Methods	Criteria for successful performance	Assessment Results: performance data, % students met criteria	Reflection on Assessment Results	Use of results/Action Plan	Status Report	
1. Setup and manipulate laboratory equipment, carry out experimental procedures and identify possible sources of error	3	<p>Bio 3 SLO # 4: Explain the importance of aseptic techniques applying universal precautions in hospital and home settings Bio 75 SLO # 1 Demonstrate competence in using laboratory equipment and techniques used in class</p> <p>Chem 30A SLO # 4 Perform laboratory techniques correctly using appropriate safety procedures.</p>	<p>Bio 3 SLO #4 Demonstration and routine laboratory exercise, including analysis of laboratory questions in practical exams.</p> <p>Bio 75 SLO #1 Analysis of skill demonstration</p> <p>Chem 30A: SLO # 4 Random laboratory checks to evaluate whether safety practices are being followed. Accuracy of student results will be evaluated</p>	<p>Bio 3 SLO # 4: 75% of students will be applying basic microbiological aseptic techniques in all experiments and follow common laboratory safety precautions. Additionally, 75% of students will be able to related experimental concepts with applications and analyze correctly the outcome / result of lab experiments.</p> <p>Bio 75 SLO # 1 60% of students will earn 70% or more of the criteria</p>	<p>Bio 3 SLO # 4: Spring 2014 65% of the students were able to apply aseptic techniques correctly</p> <p>Bio 75 SLO # 1 Fall 2014 82% of students 70% or more on a skill demo of loading a gel and pipetting properly.</p> <p>Chem 30A SLO # 4: Fall 2014 Students measured volume of water in graduated cylinders, 73% were accurate with large cylinders, 51% accurate with medium cylinder</p>	<p>Manipulating lab equipment is a learned skill. Students were able to load gel and pipette properly, as well as measure accurately with a large volume graduated cylinder. More specialized skills such as accurate measurement of small volumes and aseptic technique were more difficult to master.</p>	<p>Continue to practice skills in labs and work on lab safety. Encourage students to remind each other about safety issues and aseptic issues.</p>	<p>Continue with lots of hands on training for developing lab skills and internalizing lab safety.</p>	

			for one or two experiments	set by instructors Chem 30A: At any time, 100% of the students will be wearing goggles. 95% will be dressed appropriately (no shorts or open-toed shoes) No students will have food or drink in the lab. 80% of students will perform experimental techniques correctly	and 60% read the small cylinder correctly. In safety checks 17% of students were not wearing their goggles, 1% had food/drink containers, no students were wearing shorts or open toed shoes.			
2. Maintain a laboratory notebook according to standard scientific guidelines	3	Bio 75 SLO # 4 Effectively document observations and conclusions in a laboratory notebook and communicate the scientific information using formal laboratory reports and oral presentations.	Bio 75 SLO # 4 analysis of student kept notebooks	Bio 75 SLO # 4 60% of students will earn 70% or more of the criteria set by instructors	Bio 75 SLO # 4 Spring 2014: 93% of students earned 70% or more of the available points on the assessment of their laboratory notebooks.	Students are doing an excellent job documenting observations, data and conclusions in lab notebooks.	Continue to use paper lab notebooks as well as introduce the concept of Electronic lab notebooks as both are utilized in the workplace.	Continue to use lab notebooks to document work as is found in the workplace.
3. Write clear, well documented lab reports using the language of science	1	Bio 75 SLO # 3 Describe lab protocols, results, interpretations in a written lab report. Bio 76 SLO # 3 Analyze all phases of the biomanufacturing process and describe the various assays using in the manufacturing process Math 208: SLO # 3	Bio 75 SLO # 3 Analysis of student written lab reports Bio 76 SLO # 3 Analysis of student papers or exam questions Math 208: Analysis of exam questions Chem 30A: SLO # 5 Questions	Bio 75 60% of students will earn 70% or more of the points using a grading rubric Bio 76 SLO # 3 60% of students will earn 70% or more on exam questions Math 208 70% of students will receive 75% of the points or better	Bio 75 SLO # 3 Spring 2015 80% of the students earned 70% or more on the assignment. Bio 76 SLO # 3 Fall 2014: 92% of students earned 70% or better on an exam question dealing with the phases of a bioman process and the	Students were able to write clear explanations of data, using the language of science in lab reports, on essays and in presenting and analyzing data. Overall the criteria was met.	Continue to work with the faculty in Chemistry and Math departments on organizing the timing of the assessments of the SLOs for the Biomanufacturing Program Outlines.	Data analysis is an important skill, both in presentation of data as well as written communication and will continue to be emphasized.

		Prepare data to be analyzed using a spreadsheet program Chem 30A SLO # 5 calculate experimental values from laboratory data and interpret the results	drawn from laboratory worksheets will assess student's ability to draw conclusions from experimental data	Chem 30A: SLO # 5 75% of students should be able to draw correct conclusions from the data	assays used for that process Math 208 SLO # 3 (Spring 2011) 100% of the students passed. Criteria was met. Chem 30A: SLO # 5 not yet assessed in 2013-2016 cycle			
4. Apply mathematical problems to solve quantitative problems	2	Math 208 SLO # 4 Estimate dosages, concentrations and dilutions Chem 30A SLO # 1 Use dimensional analysis to solve quantitative problems and evaluate the results of calculations to make sure they are physically reasonable.	Math 208 SLO # 4 Analysis of exam questions Chem 30A: SLO # 1 A selection of test questions including unit analysis and stoichiometry will be evaluated for varying levels of success	Math 208 SLO # 4 70% of students will receive 75% of the points or better Chem 30A: SLO # 1 By the time of the final, 90% of the students will be able to answer unit analysis problems correctly and 75% of the students will be able to answer chemical stoichiometry problems with minor errors	Math 208 not assessed in 2013-2016 cycle Chem 30A: SLO # 1 Spring 2014 89% of students got a passing grade on a straightforward gas law problem, 77% got a passing grade on a stoichiometry straightforward problem and 64% got a passing grade on more challenging medical dosage problem.	The results were good on the straightforward problems, but the more challenging problems did not meet the criteria. These results indicate that dimensional analysis and problem solving skills need to be emphasized and integrated throughout the semesters.	Continue to work with faculty in Chem and Math departments on assessments of these SLOs for the Biomanufacturing Program Level Outcomes Report.	Math is used in many areas of the Biomanufacturing workplace and the correct solving of problems as well as critically thinking about the math concepts will continue to be taught in the Biomanufacturing Program.
5. Explain and discuss both verbally and in writing the science concepts listed in the course content, as well as their relevance to everyday events and circumstances in a broad interdisciplinary context.	4	Bio 3 SLO # 2 Explain the importance of microbes in our daily lives and critically evaluate microbial infection information as presented in the common news media Bio 76 SLO # 4 Synthesize	Bio 3 SLO # 2 Class discussion and graded assignments; also analysis of exam questions. Bio 76 SLO # 4: Analysis of student written papers Math 208: Slo #	Bio 3 SLO # 2: 75 % of students will be able to relate the fact how microbes affect us in either positive or negative way, the stages of microbial disease development process and the effective control strategy for the	Bio 3 SLO # 2 not assessed during 213-2016 cycle Bio 76 SLO # 4 Spring 2015 71% of the students earned 70% or more of the points available on this assignment. Criteria was met.	Criteria was met. Students were able to connect scientific concepts in several classes to their relevance in everyday life	Continue to emphasize critical thinking skills and reasoning by teaching students how to connect scientific concepts in their relevance in everyday life.	Continue to emphasize the relevance of science to students everyday lives and the importance of making informed decisions about scientific issues.

		<p>information, think critically and solve critical thinking problems in discussions and written essays.</p> <p>Math 208 SLO # 1 Interpret scientific notation</p>	<p>1 Analysis of exam questions</p>	<p>emerging and reemerging microbial diseases.</p> <p>Bio 76 SLO # 4: 60 % of students will earn 70 % or more of the criteria set by instructors</p> <p>Math 208 SLO # 1 70% of students will receive 75% of the points or better</p>	<p>Math 208: SLO # 1 Spring 2015: 76% of the students passed a quiz assessing this SLO</p>			
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