

## Program Outcomes and Assessment Report

<b>Department: Biology</b>	<b>Degree or certificate title</b> Certificate of Proficiency in Biomanufacturing Skills(Math 208, Chem 30A, Bio 75, )		<b>Contact:</b> Leslie Blackie Lblackie@peralta.edu		<b>Date:</b> 2013-2016			
<b>Program SLOs</b>	<b>ILO</b>	<b>Which courses and assignments address each program SLO?</b>	<b>Assessment Methods</b>	<b>Criteria for successful performance</b>	<b>Assessment Results: performance data, % students met criteria?</b>	<b>Reflection on Assessment Results</b>	<b>Use of results/Action Plan</b>	<b>Status Report</b>
1.Setup and manipulate laboratory equipment, carry out experimental procedures and identify possible sources of error	3	Bio 75 SLO # 1 Demonstrate competence in using laboratory equipment and techniques used in class Chem 30A SLO # 4 Perform laboratory techniques correctly using appropriate safety procedures.	Bio 75 SLO #1 Analysis of skill demonstration  Chem 30A : SLO # 4 Random laboratory checks by different instructors to evaluate whether safety practices are being followed. Accuracy of student results will be evaluated for one or two experiments.	Bio 75 SLO # 1 60% of students will earn 70% or more of the criteria set by instructors  Chem 30A SLO # 4 At any time, 100% of the students will be wearing goggles. 95% will be dressed appropriately (no short or open-toed shoes). No students will have food or drink in the lab. 80% of students will perform experimental techniques correctly.	Bio 75 SLO # 1 Fall 2014 82% of students 70% or more on a skill demo of loading a gel and pipetting properly Chem 30A:SLO # 4 : Fall 2014 Students measured volume of water in graduated cylinders , 73% were accurate with large cylinder, 51% accurate with medium cylinder and 60% read small cylinder. In safety checks 17% of students were not wearing their goggles, 1% had food/drink containers, no students were	Manipulating lab equipment is a learned skill. Students were able to load a gel and pipette properly (Bio 75), and were comfortable with bigger graduated cylinders, but needed to keep developing skills using smaller instrumentation. Lab safety is something that must continue to be emphasized and students needed to be reminded throughout the semester.	Continue to practice skills in labs and work on lab safety. Encourage students to remind each other about safety issues.	Continue with lots of hand on training for developing lab skills and internalizing lab safety.

					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	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 93% of students earned 70% or more of on the assessment of their laboratory notebooks.	Students are doing an excellent job documenting observations, data and conclusions in the 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 Apply Scientific method to laboratory exercises and describe lab protocols, results and interpretations in a written lab report Math 208: SLO # 3 Prepare data to be analyzed using a spreadsheet Chem 30A SLO # 5 calculate experimental values from laboratory data and interpret the results	Bio 75 SLO # 3: Analysis of student written lab reports  Math 208: SLO # 3 Analysis of exam questions  Chem 30A Questions drawn from laboratory worksheets will assess student's ability to draw conclusions from experimental data	Bio 75: 60% of students will earn 70% or more of the points using a grading rubric  Math 208: SLO # 3 70% of the students will receive 70% or more of the available points  Chem 30ASLO # 5: 75% of students should be able to draw correct conclusions from the data	Bio 75 Spring 2015: 80% of the students earned 70% of more on the assignment.  Math 208: (Spring 2011) 100% of the students passed. Criteria was met  Chem 30A: not yet assessed in 2013-2016 cycle.	The Bio 75 class writes lab reports and the Math 208 and Chem 30A classes work on the skills to present and analyze data as part of those lab reports. Overall the criteria was met.	Continue to work with faculty in Chem and Math departments on assessments of these SLOs for the Biomanufacturing Program Level Outcomes Report	Data analysis is an important skill, both in presentation of data as well as written communication and will continue to be emphasized.
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	Math 208 SLO # 4 analysis of exam questions  Chem 30ASLO # 1 A selection of test questions including unit analysis and stoichiometry will be evaluated for varying levels	Math 208: SLO # 4 70% of students will receive 70% or more of the available points.  Chem 30A SLO # 70% of students should get a passing grade on all selected test questions	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	The results were good on the straightforward problems, but the more challenging problems did not meet the criteria. These results indicate that	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

		physically reasonable.	of success.		passing grade on a stoichiometry straightforward problem and 64% got a passing grade on more challenging medical dosage problem	dimensional analysis and problem solving skills need to be emphasized and integrated throughout the semester.		Biomanufacturing program.
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