

Program Outcomes and Assessment Report

Department: Biology	Degree or certificate title AS in Biomanufacturing		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. Describe and practice laboratory safety guidelines relating to working with laboratory equipment	3	Chem 30A SLO # 4 Perform laboratory techniques correctly using appropriate safety procedures Biol 72A SLO # 2: Perform laboratory techniques correctly using appropriate safety procedures Bio 72B SLO # 1 Describe sources of contamination and how clean room equipment and procedures control contamination	Chem 30A SLO # 4: Random laboratory checks to evaluate whether safety practices are being followed. 72A random laboratory checks to evaluate whether safety practices are being followed. 72B Analysis of exam questions	Chem 30A SLO # 4 At any time 100% of the students will be wearing goggles, 95% will be dressed appropriately (no open toe shoes or shorts). No students will have food or drink in the lab. .	Chem 30A SLO # 4 Fall 2014: In safety checks 17% of students were not wearing their goggles, 1% had food/drink containers and no students were wearing shorts or open toed shoes. Bio 72A: Fall 2014 90% of students earned 70% or better on safety assessments, based on grading rubric Bio 72B: Fall 2015	Students are learning to work in the lab using the correct safety precautions.	Continue to assess students skill level with practice in the lab and checks on correct safety precautions.	Continue to assess students skill level with practice in the lab and checks on correct safety precautions.
2. Setup and manipulate laboratory equipment, carry out experimental procedures and identify possible	3	Program Level outcome # 2: Setup and manipulate laboratory equipment, carry out experimental procedures and identify possible sources of error Bio 3 SLO # 4:	Bio 3 SLO #4 Demonstration and routine laboratory exercise, including analysis of laboratory questions in practical exams.	Bio 3 SLO # 4: 75% of students will be applying basic microbiological aseptic techniques in all experiments and follow common lab safety precautions	Bio 3 SLO # 3 spring 2014: 65% of the students were able to apply aseptic techniques correctly. Bio 75 SLO # 1 Fall 2014 : 82% of students scored 70% or more of	Students are showing improvements in their skills as evidenced by the skill demonstrations in the more advanced classes. When first introduced to	Continue to assess students skill level with practice in the lab and skill assessments tests.	Continue to assess students skill level with practice in the lab and skill assessments tests.

sources of error		<p>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 Biol 72B SLO # 2 Demonstrate clean room procedures in a clean room setting Biol 72 C SLO # 3 Demonstrate competence in using laboratory equipment and techniques used in class Biol 72D SLO # 1 Demonstrate competence in using laboratory equipment and techniques used in the class Biol 79 SLO # 1 Demonstrate the ability to culture cells, monitor the health of the cells and maintain sterility of cultures</p>	<p>Bio 75 SLO #1 Analysis of skill demonstration Biol 72B SLO # 2 Analysis of skill demonstrations Biol 72 C SLO # 3 Analysis of skill demonstrations Biol 72D SLO # 1 Analysis of skill demonstrations Biol 79 SLO # 1 Analysis of skill demonstrations</p>	<p>Bio 75 SLO # 1 Fall 2014 : 82% of students scored 70% or more of the available points on a skill demo of loading a gel and pipetting properly. Biol 72B SLO # 2 60% of students will earn 70% or more of the criteria set by instructors. Biol 72 C SLO # 3 60% of students will earn 70% or more of the criteria set by instructors Biol 72D SLO # 1 60% of students will earn 70% or more of the criteria set by instructors Biol 79 SLO # 1 60% of students will earn 70% or more of the criteria set by instructors</p>	<p>the available points on a skill demo of loading a gel and pipetting properly 72B: Fall 2014: The online completion of a simulation was 100%. A lower success rate of 67% of students meeting the minimum requirements of the 70% score in the skills. 72C: SLO # Fall 2015 72D: Fall 2015 Biol 79 SLO # 1 : Spring 2015 76% earned 70% or more on the skill demonstrations and test questions. The criteria was met.</p>	<p>skills, like aseptic technique, students have more difficulty, but over the course of the Biomanufacturing program the students develop their skills.</p>		
3. Maintain a laboratory notebook	1	<p>Bio 75 SLO # 4 Effectively document</p>	<p>Bio 75 SLO # 4 analysis of student laboratory notebooks</p>	<p>Biol 75 SLO # 4: 60% of the students will earn 70% or more of the points of</p>	<p>Biol 75 SLO # 4: Spring 2014 93% of students earned 70% or more of</p>	<p>Students are doing an excellent job documenting observations, data</p>	<p>Continue to use paper lab notebooks as well as introduce the concept of</p>	<p>Continue to use lab notebooks to document work as is</p>

<p>according to standard scientific guidelines</p>		<p>observations and conclusions in a laboratory notebook and communicate the scientific information using formal laboratory reports and oral presentations. Biol 72 A SLO # 3 effectively document protocols, observations and equipment used in a laboratory notebook Biol 72 B SLO # 3 Document clean room procedures in a laboratory notebook Biol 72D SLO # 3 Document laboratory procedures, observations and conclusions in a laboratory notebook Biol 79 SLO # 3 Document laboratory procedures, observations and conclusions I Batch Records and laboratory notebooks</p>	<p>Bio 72A SLO # 3 analysis of student laboratory notebooks Biol 72 B SLO # 3 analysis of student laboratory notebooks Biol 72D SLO # 3 analysis of student laboratory notebooks Biol 79 SLO # 3 analysis of student laboratory notebooks and batch records</p>	<p>criteria set by instructors Biol 72A SLO # 3 60% of the students will earn 70% or more of the points of criteria set by instructors Biol 72B SLO # 3 60% of the students will earn 70% or more of the points of criteria set by instructors Biol 72 D SLO # 3: 60% of the students will earn 70% or more of the points of criteria set by instructors Biol 79 SLO # 3 60% of the students will earn 70% or more of the points of criteria set by instructors</p>	<p>the criteria set by instructors. 72A: SLO # 3 Fall 2013 75% of the students met the criteria 72B: SLO # 3 Fall 2013: 90% of the students met the criteria 72D:SLO # 3 Fall 2013: 100% of the students completed the assessments which was more qualitative in students working as verifier for other students lab notebooks Biol 79 SLO # 1 : Spring 2014: 93% students earned 70% or more of the criteria</p>	<p>and conclusions in lab notebooks.</p>	<p>Electronic lab notebooks as both are utilized in the workplace</p>	<p>found in the workplace.</p>
<p>4. Write clear, well documented reports or SOPs or other documentation</p>	<p>1</p>	<p>Bio 76 SLO # 3 Analyze all phases of the biomanufacturing process and describe the various assays using in the manufacturing process</p>	<p>Bio 76 SLO # 3 Analysis of student papers or student presentations that meets the requirements of a grading rubric (provided in</p>	<p>Biol 76:60% of the students will earn 70% or more of the points of criteria set by instructors</p>	<p>76: Fall 2014 92% of students earned 70% or better on an exam question dealing with the phases of biomanufacturing process and assays</p>	<p>Students develop writing skills writing lab reports and/or Standard Operating procedures (SOP) which are necessary skills</p>	<p>Continue to develop student writing skills and utilizing the language of science in lab reports, on exams and in writing and reading SOPs</p>	<p>Continue to develop student writing skills and utilizing the language of science in lab reports, on exams and in</p>

required in the lab using the language of science		<p>Math 208: SLO # 3 Prepare data to be analyzed using a spreadsheet</p> <p>Chem 30A SLO # 5 calculate experimental values from laboratory data and interpret the results</p> <p>Bio 72C SLO # 1 Demonstrate molecular cloning of DNA using PCR and evaluate results using gel electrophoresis</p> <p>Biol 74 SLO # 4 Demonstrate ability to read and write Standard Operating Procedures (SOPs)</p> <p>Biol 77 SLO # 3 Demonstrate knowledge of regulatory requirements in standard regulatory documents.</p>	<p>advance to students)</p> <p>Math 208 SLO # 3 Analysis of exam questions</p> <p>Chem 30A: SLO # 5 Questions drawn from laboratory worksheets will assess student's ability to draw conclusions from experimental data.</p> <p>Biol 72 C: SLO # 1 Analysis of student written lab reports</p> <p>Biol 74 SLO # 4 Analysis of exam questions and student written SOPs</p> <p>Biol 77 SLO # 3 Analysis of student written regulatory documents</p>	<p>Biol 77 : 75% of the students will get full credit</p> <p>Biol 74 70% of students earned 70% or more of the available points.</p>	<p>Math 208 SLO # 3: (spring 2011) 100% of the students passes. Criteria was met.</p> <p>Chem 30A: SLO # 5 not yet assessed in 2013-2016 cycle.</p> <p>Biol 72C: Fall 2013: 72% of the students submitted reports that all received a score of 85% or higher></p> <p>All of the students participated in performing the PCR experimentation</p> <p>74 Fall 2015 SLO # 4 88% of the students earned 70% or more of the available points.</p> <p>77: Spring 2014: 81% of students earned full credit on essay question</p>	for communication in the workplace		writing and reading SOPs
5. Apply mathematics to solve quantitative problems	2	<p>Math 208 SLO # 4 Estimate dosages, concentrations and dilutions</p> <p>Chem 30A SLO # 1 Use dimensional analysis to solve quantitative problems and evaluate the results of calculations to make sure they are physically reasonable.</p>	<p>Math 208: SLO # 4 Analysis of exam questions</p> <p>Chem 30A: SLO # 1 A selection of test questions including unit analysis and stoichiometry will be evaluated for varying levels of success</p>	<p>Math 208: SLO # 4 70% of students will receive 75% of the points or better</p> <p>Chem 30A: SLO # 1: By the time of the final, 90% of the students will be able to answer unit analysis problems and 75% of the students will be able to answer</p>	<p>Math 208: SLO # 4 not assessed in 2013-2016 cycle</p> <p>Chem 30A: ongoing assessment</p> <p>72C: Fall 2014 85% of students earned 70% or better on solution calculations on a quiz</p>	Students are doing an excellent job with contextualized use of mathematics in a variety of the biomanufacturing program classes.	Continue to assess students skill level with calculations and quantitative problems	Continue to emphasize contextualized math in a variety of classes.

		<p>Biol 72C SLO # 2 Perform calculations for accurate solution preparation</p> <p>Biol 79 SLO # 4 Solve mathematical calculations involved in making solutions, cell growth analysis and protein purification</p>	<p>Biol 72C SLO # 2 Analysis of exam questions</p> <p>Biol 79 SLO # 4 Analysis of exam questions that involve mathematical calculations.</p>	<p>chemical stoichiometry problems with minor errors. 72C 60% of students will earn 70% of more of the criteria set by instructors.</p> <p>Bio 79: 60% of the students will earn 70% or more of the criteria set by instructors.</p>	<p>Bio 79 SLO # 2 87% earned 70% or more of the points</p>			
<p>6. 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.</p>	4	<p>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</p> <p>Bio 76 SLO # 4 Synthesize information, think critically and solve critical thinking problems in discussions and written essays.</p> <p>Biol 74 SLO # 1 Analyze diverse scientific literature and research articles through classroom participation and written papers</p> <p>Biol 77 SLO # 2 Analyze good manufacturing practices in terms of product safety,</p>	<p>Bio 3 SLO # 2 Class discussion and graded assignments; also analysis of exam questions.</p> <p>Bio 76 SLO # 4: Analysis of student written papers</p> <p>Bio 74 SLO # 1: Analysis of student written papers</p> <p>Bio 77 SLO # 4: Analysis of exam questions. Multiple choice, short answer and essay questions will be examined.</p>	<p>Biol 3 75% of the students will be able to relate how microbes affect us either in the positive or the negative way and the stages of disease.</p> <p>Bio 76 60% of the students will earn 70% or more of the points of criteria set by instructors</p> <p>Bio 74 60% of Students will earn 70% or more of the available points</p> <p>Bio 77 SLO # 4 60% of students will earn 70% or more of the points available</p>	<p>Bio 3 SLO # 2 not assessed during the 2013-2016 Bioman program cycle</p> <p>76; Spring 2015 SLO # 4 71% of the students earned 70% or more on this assignment. Criteria was met.</p> <p>74; Fall 2013 SLO # 1: 85% of the students earned 70% or more of the points available</p> <p>77: Spring 2015 85% of the students got full credit on essay questions</p>	<p>Criteria was met. Students were able to connect scientific concepts in several classes to their relevance in everyday life.</p>	<p>Continue to emphasize critical thinking skills and reasoning by teaching students how to connect scientific concepts in their relevance in everyday life.</p>	<p>Continue to emphasize the relevance of science to students everyday lives and the importance of making informed decisions about scientific issues.</p>

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