**Academic Program Assessment Report for AY 2021-2022**

**Program:**_____Biology_____

**(Due: June 1, 2022)**

**Date report completed:** ____5/24/22_____

**Completed by:**_____Jeff Smith_____

**Assessment contributors (other faculty involved):** _____Entire faculty of Biology_____

Please describe the 2021-2022 assessment activities and follow-up for your program below. Please complete this form for each undergraduate major, minor, certificate, and graduate program (e.g., B.A., B.S., B.A.S, M.S.) in your department. Please copy any addenda (e.g., rubrics) and paste them in this document, save and submit it to both the Dean of your college/school and to the Executive Director for Assessment as an email attachment by June 1, 2022. You'll also find this form on the assessment website at https://www.csupueblo.edu/assessment-and-student-learning/resources.html. Thank you.

**Brief statement of Program mission and goals:**

**I. Assessment of Student Learning Outcomes (SLOs) in this cycle.** Including processes, results, and recommendations for improved student learning. Use Column H to describe improvements planned for 2019-2020 based on the assessment process.

| A. Which of the program SLOs were assessed during this cycle? **Please include the outcome(s) verbatim from the assessment plan.** | B. When was this SLO last reported on prior to this cycle? (semester and year) | C. What method was used for assessing the SLO? **Please include a copy of any rubrics used in the assessment process.** | D. Who was assessed? Please fully describe the student group(s) and the number of students or artifacts involved (N). | E. What is the expected proficiency level and how many or what proportion of students should be at that level? | F. What were the results of the assessment? (Include the proportion of students meeting proficiency.) | G. What were the department's conclusions about student performance? | H. What changes/improvements to the program are planned based on this assessment? |
|---|---|---|---|---|---|---|---|
| SLO 1) Students will develop a broad-based knowledge of concepts and terminology in molecular, cellular, organismal, and ecological biology. | Spring 2021 | **SLO 1**. Administer the GRE to each class of First Year Seminar (BIOL 171) for baseline assessment.<br><br>Administer the GRE and MFAT exam to each class of Senior Seminar (BIOL 493). | 17 students took the GRE exam in Biol 171.<br><br>26 students took the GRE exam in Biol 493.<br><br>37 students took the MFAT exam in BIOL 493. | Our goal is to have 75% of our senior students score at 70% or higher on the GRE in the BIOL 493 class,<br><br>…and to have 75% of our senior students score at or above 50% of National percentile on the MFAT exam. | For the GRE exam, BIO 171 students scored 30 +/- 6%.<br><br>For the GRE exam, BIO 493 students scored 42+/- 7%.<br><br>For the MFAT exam, 49% of BIO 493 students scored above the 50th percentile. | Students improved on average 12% from BIO 171 to BIO 493.<br><br>BIO 493 students scored 28% lower on the GRE than the departmental target.<br><br>With the MFAT, we significantly missed our target of 75% of students above the 50th percentile, only | The department initiated a core-curriculum evaluation and redesign this spring. Major focus is on improving the cell and molecular component of the core curriculum. This is the section in which our students most underperformed in the MFAT exam this year:<br><br>Total score percentile 46<br>**Cell bio 37**<br>**Molec/gen 32**<br>Organism 57<br>Pop bio 61 |

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| | | | | | | 49% reached the 50th percentile. | |
| | | | | | | | |
| SLO 2) Students will develop applied scientific skills though field and laboratory experience and data analysis. | This SLO has not been previously assessed | **SLO 2.** Assess the applied scientific skills of our students during their first year (College Biology I BIOL 181 Lab and College Biology II 182 Lab) and second year (Botany BIOL 201 Lab or Zoology BIOL 202 Lab) and compare the applied scientific skills of the same students during their junior or senior year in Microbiology (BIOL 301 Lab). Three rubrics are attached. | 29 students in BIO 181L, 14 students in BIO 202L, 17-23 students in BIO 182L, involving 6 different instructors provided the baseline data.<br><br>One instructor and 11 students provided the outcome data from BIO 301L. | Our goal is to have 80% of our junior or senior students show increased proficiency. | Baseline skills assessed were: 1. Focusing a microcope, 2. Making a graph, 3. Micropipetting, 4. Doing gel electrophoresis, and 5. Statistical analysis. 24% of students were excellent at these skills and 44% were proficient. The remaining 31% combined were developmental and ineffective.<br><br>Outcome skills assessed in 301L were 1) Doing gel electrophoresis, 2) focusing a microscope, 3) Micropipetting, and 4) Isolating bacterial | Students improved their skills as assessed, but it was difficult to put a number on it without a linear design. | It was decided that for the next assessment cyle for this SLO, 1) more thought should be put into choosing the skill set to be assessed, so as to involve a greater repitoire of skills, 2) that better matching of skills assessed between baseline and outcome groups should be preconcieved, and 3) more courses and instructors should be involved in assessing skills for the outcome group.<br><br>We also decided to alter the goal language to be that 80% of our outcome group would be excellent/proficient combined. We did meet that goal this year. |

| | | | | | | | |
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| | | | | | colonies. 73% of the students were assessed as excellent, 23% as proficient, and 5% as developmental. | | |

Comments on part I:

**II. Closing the Loop. Describe at least one data-informed change to your curriculum during the 2021-2022 cycle.** These are those that were based on, or implemented to address, the results of assessment from previous cycles.

| A. What SLO(s) or other issues did you address in this cycle? **Please include the outcome(s) verbatim from the assessment plan.** | B. When was this SLO last assessed to generate the data which informed the change? Please indicate the semester and year. | C. What were the recommendations for change from the previous assessment column H and/or feedback? | D. How were the recommendations for change acted upon? | E. What were the results of the changes? If the changes were not effective, what are the next steps or the new recommendations? |
|---|---|---|---|---|
| SLO 1. Students will develop a broad-based knowledge and application of concepts, techniques and terminology in molecular, cellular, organismal, evolutionary and ecological biology. | Last year | The department discussed the result and determined that an improvement would be to increase our delivery of cell biology materials. A process to develop a curriculum map was initiated to more finely evalute where the gaps in instruction are. | The department has been constructing a fine-grained core-curriculum map, and is negotiating changes to the core curriculum based on that analysis. | The process is ongoing in the current summer and the department aims to make changes for the CAP Board to consider next fall. |
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Comments on part II:

**CSU-Pueblo Biology: Student Learning Objective #2: Students will develop applied scientific skills through field and laboratory experience and data analysis**

| SKILL | 182L | 301L | 181L | 201L/202L | Method of assessment |
|---|---|---|---|---|---|
| **Focus an specimen on a microscope** | ☑ | ☑ | ☑ | ☑ | Practical |
| **Make an agarose gel and carry out gel electrophoresis** | ☑ | ☑ | | | Exam question |
| **Measure the absorbance of a solution using an spectrophotometer** | ☑ | ☑ | | | Practical |
| **Measure uL volumes using different size micropipetters** | ☑ | ☑ | ☑ | | Practical |
| **Prepare a solution of a specific concentration from a stock solution** | ☑ | ☑ | | | Exam question |
| **Set up a serial dilution** | | ☑ | | | Exam questions |
| **Conduct basic statistics on data (e.g. Chi square or t test)** | | | | ☑ | |
| **Use Excel to generate a table or graph** | ☑ | ☑ | ☑ | ☑ | Assignment |
| **Do a BLAST search of a protein or gene sequence** | ☑ | ☑ | | | Assignment |
| **Dissect a specimen** | | | | | |
| **Handle animals safely** | | | ☑ | | |
| **Collect and press plant samples** | | | | | |
| **Isolate bacterial colonies in an agar plate** | | ☑ | | | Practical + unknowns |
| **Use aseptic technique** | | ☑ | | | Practical |
| **Identify organisms using a taxonomic key/field guide** | | ☑ | | | Microbiology unknowns |

**Specific outcomes:** Amaya will add a second practical to her Microbiology course to assess spectrophotometry readiness and the use of micropipettes; she will also add exam questions with regards to making a solution from a specific concentration from a stock solution.

**CSU-Pueblo Biology: Student Learning Objective #2: Students will develop applied scientific skills through field and laboratory experience and data analysis**

**SEMESTER/YEAR:**

**COURSE:**

**INSTRUCTOR:**

**SKILL ASSESSED:**

**TOTAL NUMBER OF STUDENTS:**

| | |
|---|---|
| Excellent total: | Excellent percentage: |
| Proficient total: | Proficient percentage: |
| Developmental total: | Developmental percentage: |
| Ineffective total: | Ineffective percentage: |

**Excellent:** requires no assistance or there are no errors

**Proficient**: requires minimal assistance or there are minor errors

**Developmental:** requires significant assistance or there are major errors

**Ineffective:** cannot do it

**CSU-Pueblo Biology: Student Learning Objective #2: Students will develop applied scientific skills through field and laboratory experience and data analysis**

**SEMESTER/YEAR:**

**MAJOR CONCENTRATION: (circle)** Wildlife Biomedical General Cell/Mol Other

Thank you for participating in this survey. Please look at the following list of applied laboratory skills and, for each**, indicate with an X** whether you are comfortable doing it, whether you feel you could do this with help, whether you cannot do it, or whether you have never heard of this skill (**choose only one**!). Different students take different lab courses, so unless you have taken a lot of labs you might not have heard of some of these.

| SKILL | CAN DO IT | CAN DO IT WITH HELP | CANNOT DO IT | HAVE NEVER HEARD OF IT | COMMENTS |
|---|---|---|---|---|---|
| **Focus an specimen on a microscope** | | | | | |
| **Make an agarose gel and carry out gel electrophoresis** | | | | | |
| **Measure the absorbance of a solution using an spectrophotometer** | | | | | |
| **Measure uL volumes using different size micropipetters** | | | | | |
| **Prepare a solution of a specific concentration from a stock solution** | | | | | |
| **Conduct basic statistics on data (e.g. Chi square or t test)** | | | | | |
| **Use Excel to generate a table or graph** | | | | | |
| **Do a BLAST search of a protein or gene sequence** | | | | | |
| **Dissect a specimen** | | | | | |
| **Handle animals safely** | | | | | |
| **Collect and press plant samples** | | | | | |
| **Isolate bacterial colonies in an agar plate** | | | | | |
| **Use aseptic technique** | | | | | |
| **Identify organisms using a taxonomic key/field guide** | | | | | |