**WVSU Academic Affairs Assessment of Student Learning**

**Report for Academic Year 2022 - 2023**

**Biotechnology Graduate Program**

December 4, 2023

**1. Which learning outcomes did you measure this past year? [Please indicate whether any of these**

**measures were conducted as follow-up to a previous year’s issues or in response to Program Review. Be specific.]**

During the academic year 2022 - 2023, our Biotechnology Graduate Program undertook the evaluation of two key program learning outcomes:

1. **PLO 1**: This involved assessing students' proficiency in applying the Scientific Method to solve relevant issues in the field of Biotechnology.
2. **PLO 2**: This focused on evaluating students' skills in professional communication, both written and oral, at a level expected of individuals holding a Master's degree in this discipline.

These program learning outcomes were established in the spring of 2022. This initiative was partially a response to the Biotechnology Program Review conducted in 2020 - 2021, and also a part of our continuous effort to develop an effective assessment framework.

To effectively evaluate both PLOs, our approach included analyzing grant proposals in the BT 567 course and reviewing topical presentations in the BT 511 course. For each course, we assessed the students' capabilities in both written and oral communication, ensuring that they could adeptly convey the same content in both formats.

**2. In which course(s) were assessments conducted?**

The course "Current Concepts in Biotechnology" (BT 567) is a fundamental part of our program, available each fall. Typically, students enroll in this course during their first or second semester.

Additionally, the "Biotechnology Seminar" (BT 511) is another integral course that runs every semester. As a requirement of the program, students are expected to complete this course twice. Our assessment focuses on students during their second enrollment in this course.

**3. How did you assess the learning outcomes (s)? (i.e., tool, e.g., rubric, national norms, item analysis,**

**sampling; and object, e.g., student projects, presentations, exams, etc.)**

Three distinct rubrics were created and implemented for the evaluation process, with one dedicated to each Program Learning Outcome and their respective modes of communication. The program assessment committee actively participated in this process by attending classes to observe students' oral presentations and by reviewing formal written documents. Each of these rubrics utilized a scoring system ranging from 1 to 5, and the scores were subsequently compiled for analysis.

**4. Who analyzed results and how were they analyzed? (Committee, assessment liaison, department**

**faculty, statistical review vs. benchmark, Live Text, etc.)**

The evaluation of the program was overseen by the program assessment committee, which included Drs. Umesh Reddy (Coordinator of the BT Program), Purushothaman Natarajan (Bioinformatician), and Padma Nimmakayala (Research Professor of Biotechnology). This committee was responsible for examining the assessment results, formulating potential conclusions, and determining future actions. Their collaborative efforts involved numerous informal discussions in addition to formal meetings held on September 10, 2022, and May 28, 2023. In analyzing the results, the committee took into consideration the impact of small sample sizes, which affected both the student participants and the assessors in the evaluation process.

**5 and 6. Summarize results/findings/conclusions. (Data analysis) What we found and what it means. What are next steps? (e.g., will you measure this same learning outcome again? Will you change some feature of the classroom experience and measure its impact? Will you try a new tool? Are you satisfied?)**

Enclosed in this document are spreadsheets containing scores for each Program Learning Outcome (PLO) and their respective communication modes, covering both the Fall 2022 and Spring 2023 semesters. For each element of PLO 1, as well as the written and oral components of PLO 2, average scores were computed.

From the data of the academic year 2022 - 2023, we observed no significant trends. Moving forward, from the academic year 2023-2024 onwards, our focus will shift to tracking the students' participation in regional, national and international conferences, poster presentations and peer reviewed publications. Through the existing process, we have identified and begun to address certain limitations in our assessment techniques. During the assessment committee meeting on May 28, 2023, it was concluded that PLO 1, as it currently stands, is too vague for direct evaluation, and our existing assessment methods are insufficient for its measurement. Consequently, the faculty decided to replace the existing PLO 1 with a new learning outcome.

The revised PLO 1 will now be "demonstrate knowledge fundamental to the field of Biotechnology". To align our assessment more closely with our educational objectives, we plan to collect conference presentations or journal publications. This will measure the effectiveness of our research endeavor pertaining to the field of Biotechnology.

Regarding PLO 2, we find our current assessment approach to be effective and plan to maintain the same methods, including the collection points and tools, for the academic year 2023 - 2024 and beyond. This decision underscores our commitment to consistency in the assessment process. We anticipate that over time, discernible patterns will surface, offering insights to refine our program. There will be a minor adjustment in our methodology: instead of evaluating the oral component of PLO 2 during the second round of BT 511 (which could occur as early as the second semester), we will shift this assessment to coincide with the students' thesis presentations at the conclusion of their final semester. The written component of PLO 2 will continue to be assessed during the second iteration of BT 511.

However, we have identified two areas of concern in our methodology for PLO 2. Firstly, using the same rubric for assessments at different stages in the program (initially in BT 567 and later in BT 511) presents a challenge in maintaining consistent expectations. We acknowledge that our expectations for a student in their fourth semester are naturally higher than for one in their first semester. For example, a performance that earns a "5" for a newcomer might only be rated a "3" two years later. Despite this, we will continue using the same rubric at both stages, while being mindful of and attempting to mitigate any bias stemming from these evolving expectations. Secondly, the limited timeframe of a two-year master's program poses a challenge in observing substantial improvements in communication skills. Although we hope to see more pronounced progress in PLO 1, we recognize the vital role of communication skills in our students' education and will persist in assessing this aspect.