ASSESSMENT REPORT
2017-2018

Biology Undergraduate (Instructional Degree Program)

B.S./B.A. (Degree Level)

Program Mission:
The mission of the Biology program is to provide undergraduate and graduate students with a high quality science education that includes experience with research and field projects. The program provides a scientific and technical background that empowers students to successfully pursue science and technology careers, or proceed on to advanced graduate studies.

Student Learning Outcome 1:

Have a command of basic biological knowledge in the areas of ecology and evolution, cell and molecular biology and organismal biology.

NMHU Traits Specifically Linked to Student Learning Outcome 1

- Mastery of Content Knowledge and Skills

First Means of Assessment for Outcome 1:
Successful students will master course content in representative upper level major courses, with an average grade of "C" or better on class tests and laboratory reports in Biol 300 (SP 2018, Linder), Biol 332 (SP 2018, Snow), Biol 303 (SP 2018, Romine), Biol 474 (FA 2017, Rivas). 75% or more students will meet our criteria for success.

Summary of Data:

Number of Students Meeting Criterion:	56	Number of Students Not Meeting Criterion:	16
Total Number of Students Assessed:	72	Percent of Students Meeting Criterion:	78%

Second Means of Assessment for Outcome 1:
Graduating seniors will take the MFAT test. This test will allow us to track individual performance over time. The MFAT test is more a measure of determining how our students compare to national averages.

Summary of Data: The MFAT was not given to students this academic year.

Number of Students Meeting Criterion:	N/A	Number of Students Not Meeting Criterion:	N/A
Total Number of Students Assessed:	N/A	Percent of Students Meeting Criterion:	**N/A**

Interpretation of Results for Outcome 1:

Biology students successfully mastered content in the first means of assessing outcome 1. However, when compared to the success rate for the 2016-1017 academic year, the rate decreased from 93% to 78%. This may be due to several factors including increasing the number of courses in the assessment from 2-4, the types of courses included, and the fact that some of the courses included non-biology majors. In the future, if possible, only biology majors should be included in the assessment results. As we work on the curriculum mapping of our program, we should be able to determine how the types of courses affected the outcomes and how we might be able to increase student success.

We will be using the MFAT test data from senior biology majors in our 5 year program assessment. Because results do not fit into binary 0/1 categories, they are more appropriate for assessing curriculum programing within each subdiscipline of biology. The MFAT is also difficult to interpret because it is a standardized test and does not accurately reflect the content and skills emphasized in our program.

Student Learning Outcome 2:

Have an understanding of and the ability to use scientific methodology and technology through which biological knowledge accumulates.

NMHU Traits Specifically Linked to Student Learning Outcome 2

- Effective Communication Skills
- Effective Use of Technology

First Means of Assessment for Outcome 2:

Senior project-successful students will show mastery and apply knowledge of basic biological principles to a degree that is satisfactory to the faculty of the biology discipline as indicated by a grade of "B" or better in Biol 491 (Fall 2017, Snow). 75% or more of students will meet our criteria for success.

Summary of Data

Number of Students Meeting Criterion:	19	Number of Students Not Meeting Criterion:	**1**
Total Number of Students Assessed:	20	Percent of Students Meeting Criterion:	95%

Second Means of Assessment for Outcome 2:

Mastery of laboratyory skills and techniques demonstrated by an an average grade of

“C” or better on laboratory reports for representative upper level courses: Biol 300 (SP 2018, Linder), Biol 332 (SP 2018, Nelson), Biol 389 (FA 2017, Hinshaw). 75% or more of students will meet our criteria for success.

Summary of Data:

Number of Students Meeting Criterion:	40	Number of Students Not Meeting Criterion:	13
Total Number of Students Assessed:	53	Percent of Students Meeting Criterion:	76%

Interpretation of Results for Outcome 2:

Both measures of SLO 2 demonstrate successful mastery of this outcome among biology program students. Students demonstrated their ability to use the scientific method and technology at the senior level in capstone research courses and in junior and senior course labs. The second means of assessment surveying mastery among 300 and 400 level courses indicates a decline in the percentage of students meeting the criterion for success (76% met). Our revised OA plan (2018) provides assessment of this outcome at the 200 level (SLO 2a) and the 300-400 level (SLO 2b) to be able to track progress and success of biology majors. The progression of skills using the scientific method and technology will be tracked using revised SLOs and curriculum mapping of course skills in 2019.

Student Learning Outcome 3:

Be able to effectively communicate and critically analyze biological knowledge.

NMHU Traits Specifically Linked to Student Learning Outcome 3

- Effective Communication Skills
- Critical and Reflective Thinking Skills
- Effective Use of Technology

First Means of Assessment for Outcome 3:

Successful students will demonstrate mastery with scores of "B" or better for research papers and/or oral presentations in representative upper level courses, Biol 491 (Fall 2017, Snow), Biol 498 (SP 2018, Rivas), Biol 332 (Spring, 2018, Snow), Biol 300 (SP 2018, Linder).

Summary of Data

Number of Students Meeting Criterion:	46	Number of Students Not Meeting Criterion:	13
Total Number of Students Assessed:	59	Percent of Students Meeting Criterion:	78%

Second Means of Assessment for Outcome 3:

Successful students will show mastery and apply knowledge of basic biological principles to a degree that is satisfactory to the faculty of the biology discipline as indicated by a grade of "B" or better on the Senior project (Biol 498 Spring 2018, Rivas). 75% or more of students will meet our criteria for success.

Summary of Data

Number of Students Meeting Criterion:	**5**	Number of Students Not Meeting Criterion:	2
Total Number of Students Assessed:	7	Percent of Students Meeting Criterion:	71%

Interpretation of Results for Outcome 3:

We measured biology student ability to communicate and analyze biological knowledge through assessment of the representative upper level courses senior project performance (capstone research). The majority of students successfully met the criteria set for this SLO (78% for the first means of assessment and 71% for the second mean of assessment). The small sample size for Senior Project (Biol 498) limited our results and therefore our interpretation for SLO 3, second means of assessment. These assessment data indicate that many of our students, but not as many as we would like, are able to effectively analyze and communicate biological knowledge. We plan to adjust our means of assessments to focus more on the incorporation of the scientific method and technology (OA Plan 2018 revision SLO 3b). In addition, we will add a third means of assessment, which focuses on analyzing the scientific literature critically (OA Plan 2018 revision SLO 3c).

Student Learning Outcome 4:

Receive a comprehensive background essential to advanced work and/or a career in biology or related fields.

NMHU Traits Specifically Linked to Student Learning Outcome 4

- Mastery of Content Knowledge and Skills
- Effective Communication Skills
- Critical and Reflective Thinking Skills

First Means of Assessment for Outcome 4:

The student satisfaction survey administered to all graduating seniors by the Office of Institutional Research and Effectiveness. Measures of success- 50% or more of respondents indicate that they are continuing their education or employment in biology or

related area. 75% of the respondents will indicate that they are satisfied or very satisfied with their preparation for work or graduate school. Faculty knowledge will be used to collect information on career paths of students who graduated the previous year.

Summary of Data:

Number of Students Meeting Criterion:	N/A	Number of Students Not Meeting Criterion:	N/A
Total Number of Students Assessed:	0	Percent of Students Meeting Criterion:	N/A

Interpretation of Results for Outcome 4:

Due to changes in the Office of Institutional Research and Effectiveness and changes in the Biology Program, we do not currently have a student satisfaction survey that is administered in the senior year. As part of our Outcomes Assessment plan revisions this 2018-2019 academic year, we will be re-establishing a survey to be deployed at the end of this academic year.

Utilization of Results:

Outcomes assessment results agreed with prior year analysis that a new plan is needed to better sample outcomes across our four-year curriculum. The new plan has been submitted and reviewed and will be used 2018-2019 to assess both 100-200 level biology courses and continue to assess upper level courses.

The outcomes from 2017-2018 indicate that we met our criteria for success across three learning outcomes we were able to measure. We had data availability issues with some senior research project grades and therefore SLO 3b was just under the criterion for success (71% met criterion) with a small sample size (n=7). We note that many of our criteria were passed but not by a wide margin and therefore we are revisiting our strategic plan to find areas of improvement for student learning success (see below).

We reviewed newly available dashboard data from the OIER for fall 2016 and noted the following trends in biology undergraduate majors:

1. Biology has many FTFT freshmen coming into the program (79%) compared to HU campus (44%). We are aware of the need to assess outcomes at 100-200 levels in our new OA plan which will help to improve retention of these students.
2. The biology program has fewer transfer students into biology with associate degrees than other programs at Highlands. This is a potential area of growth that relates to our strategic plan of increasing activities at community colleges to recruit these students to the biology program.
3. The Biology program has fewer first generation college students (40%) compared

with the HU campus (54%) indicating that we could provide better resources for this demographic to be supported in pursuing a STEM degree and increase inclusivity for this demographic in STEM.

4. Biology has more student athletes (26%) than HU campus (14%) and therefore we need to be cognizant of athlete needs and schedules to maintain retention of this demographic in our program. We recognize the challenges of athletic schedules while earning a science degree. Our peer and cohort learning techniques work well for these students as well as articulation in course activities and support between ARMAS and the biology faculty.
5. Students do well moving through the Biology degree program in a timely manner, indicated by the 50% upper division students in our program (compared to 65% on HU campus).

Changes to Program Based on Results:

The outcomes assessment metrics demonstrated success in Biology across a range of learning outcomes met by students. However, SLO 3 which measures the ability to communicate and utilize biological information, did not meet criteria for success by a small margin as measured by performance in senior capstone research project. We are missing data (7/14 students) for SLO 3 and this may have contributed to not meeting criteria for success. These outcomes demonstrate a need to use our newly approved OA plan for biology in 2018-2019 in order to determine the sources of student learning challenges and therefore address them.

The Biology program identified two areas of improvement in our assessment process: 1) outcomes assessment at freshmen and sophomore level (addressed in the new OA Plan for use this coming year), and 2) some outcomes that need to be assessed by Program Review rather than outcomes assessment (e.g. MFAT national test).
Our analysis of students in our program available by 2016 Dashboard data suggests that we have a good influx of FTFT freshmen in biology, and we will need to continue to improve retention of these freshmen through our program and revisit recruitment of transfer students from community colleges. Our outcomes were overall successful, but our objective is to improve the margin of SLO success in coming years. In alignment with our department strategic plan, we will 1) improve recruiting at community colleges to inform potential students about the degree options and career opportunities for biology majors, 2) pursue budget requests for technological resources necessary to build engaging applied experiences within our courses that improve future employability, 3) build a Biology Club with opportunities to attend local events and create an active biology student cohort, and 4) improve advising practices and set the goal of advising each biology student once a semester.