

Assessment Cycle Plan

Academic Year 2016 – 2017

Bachelor of Science in Applied Microbiology

College: Arts and Sciences

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Northwestern Mission. Northwestern State University is a responsive, Student-oriented institution that is committed to the creation, dissemination, and acquisition of knowledge through teaching, research, and service. The University maintains as its highest priority excellence in teaching in graduate and undergraduate programs. Northwestern State University prepares its Students to become productive members of society and promotes economic development and improvements in the quality of life of the citizens in its region.

College of Arts and Sciences' Mission. College of Arts and Sciences' Mission. The College of Arts & Sciences, the largest college at Northwestern State University, is a diverse community of scholars, teachers, and students, working collaboratively to acquire, create, and disseminate knowledge through transformational, high-impact experiential learning practices, research, and service. The College strives to produce graduates who are productive members of society equipped with the capability to promote economic and social development and improve the overall quality of life in the region. The College provides an unequaled undergraduate education in the social and behavioral sciences, English, communication, journalism, media arts, biological and physical sciences, and the creative and performing arts, and at the graduate level in the creative and performing arts, English, TESOL, and Homeland Security. Uniquely, the College houses the Louisiana Scholars' College (the State's designated Honors College), the Louisiana Folklife Center, and the Creole Center, demonstrating its commitment to community service, research, and preservation of Louisiana's precious resources.

School of Biological and Physical Sciences. The School of Biological and Physical Sciences will become a reputable leader in public higher education by providing a transformative science educational experience using innovative instructional methods and through the scholarly achievements of our faculty, staff, students, and alumni. The School serves and inspires the students of Northwestern State University and the public through the development of lifelong learners who are excited about science, are disciplined in analytical and critical thinking skills, and are socially, environmentally, and ethically responsible. The School delivers Associate degrees in Veterinary Technology, Bachelor of Science degrees in Biology (with concentrations in Biomedical, Clinical Laboratory Science, Forensic Science, Natural Science, and Veterinary Technology), Applied Microbiology (with concentrations in Environmental and Applied Microbiology

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and Medical and Health Profession), and Physical Sciences. The School also offers minors in Biology, Microbiology, Wildlife Management, and Chemistry.

Applied Microbiology Program Mission Statement. The mission of the Northwestern State University Applied Microbiology program is to provide a comprehensive education in microbiology for all of our majors to give them an understanding of the current state of technology to address problems in both environmental and/or medical microbiology. .

Purpose (optional): The primary goal of the Applied Microbiology program is to prepare students to enter into the job market competitively at the bachelor level or to further their education in either graduate or professional school.

Methodology: The assessment process for the Applied Microbiology program is as follows:

- (1) Data from assessment tools (both direct – indirect, quantitative and qualitative) are collected and returned to the program coordinator;
- (2) The program coordinator will analyze the data to determine whether students have met measurable outcomes;
- (3) Results from the assessment will be discussed with the program faculty;
- (4) The program coordinator, in consultation with the director of the School of Biological and Physical Sciences as well as the School advisory committee, will propose changes to measurable outcomes and/or assessment tools for the next assessment period and, where needed, curricula and program changes.

Student Learning Outcomes:

NOTE: The Spring 2017 semester was the first semester in which students could declare a major in Applied Microbiology. Therefore, the data collection for this program was limited as only three majors were enrolled and only one of those students took a required course for the major.

SLO 1. Students will demonstrate their knowledge of experimental design.

Course Map: BIOL2090 - Microbiology II and BIOL2091 - Microbiology II Laboratory. All majors are required to complete BIOL2090 and BIOL2091.

Measure 1.1. (Direct – knowledge)

Throughout the course, students will learn how to develop a hypothesis, identify experimental variables, and explain what types of experimental controls should be used to test the hypothesis from a dataset specific for microbiology. Each student is required

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to pass a quiz covering these concepts. The target is to have 100% of students attain a quiz grade of $\geq 70\%$.

Findings: Target not met. 0/1 (0%) applied microbiology majors earned $\geq 70\%$ on this quiz.

Analysis: Far less than 70% of students reached the target set for this outcome showing that lower-level students at the beginning of the program are not able to explain/describe experimental design and cannot perform to the set target.

Decision: The delivery of course material will be altered to improve student comprehension and retention. The target of this SLO will be maintained until $\geq 70\%$ of students are able to demonstrate knowledge of experimental design. With an increase in the number of applied microbiology majors, future results will be more meaningful.

Measure 1.2. (Direct – knowledge)

As part of the final examination for BIOL2090, students must answer two constructive response questions assessing their understanding of experimental design. The target is to have 100% of the students earn at least 50% of the points on each of those questions.

Findings: Target met. 1/1 (100%) applied microbiology majors earned more than 50% of the points on each of the experimental design questions on this final exam.

Analysis: The target of 100% for this student learning outcome was reached showing that lower-level students can demonstrate their knowledge of experimental design and can perform to the set target.

Decision: With only one student reporting, the data are not very convincing. The target of this SLO will be maintained until 100% of students are earning greater than 50% of the points for these questions. With an increase in the number of applied microbiology majors, future results will be more meaningful.

SLO 2. Students will demonstrate their ability to analyze scientific data.

Course Map: BIOL2090 - Microbiology II. All majors are required to complete BIOL2090.

Measure 2.1. (Direct – knowledge)

Throughout the course, students will read recently-published, peer-reviewed primary research articles and analyze scientific data regarding the human microbiome. Each student is required to develop a 15-minute presentation based on the concepts

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described in these articles. The target is to have 100% of students satisfy the grading rubric for the presentation.

Findings: Target met. 1/1 (100%) applied microbiology majors satisfied the rubric for their presentation.

Analysis: The target of 100% for this student learning outcome was reached showing that lower-level students can demonstrate their ability to analyze scientific data and can perform to the set target. Upon further consideration of the rubric used to evaluate the students' article selection and presentation, it was decided that the associated rubric is not appropriate for this measure.

Decision: With only one student reporting, the data is not very convincing. The target of this SLO will be maintained until 100% of students are satisfying the rubric. With an increase in the number of applied microbiology majors, future results will be more meaningful. Additionally, the rubric will be modified to include more direct measurements of the students' analysis of the articles rather than simply their selection of the article. The new rubric will be used during the 2017-2018 academic year.

Measure 2.2. (Direct – knowledge)

As part of the final examination for BIOL2090, students must answer a constructive response question assessing their understanding of the “suprahuman”. The target is to have 100% of the students earn at least 70% of the points on the question.

Findings: Target met. 1/1 (100%) applied microbiology majors earned at least 70% of the credit for the discussion question.

Analysis: The target of 100% for this student learning outcome was reached showing that lower-level students can demonstrate their ability to analyze scientific data regarding the “suprahuman” and can perform to the set target.

Decision: With only one student reporting, the data is not very convincing. The target of this SLO will be maintained until 100% of students are earning at least 70% of the points for this question. With an increase in the number of applied microbiology majors, future results will be more meaningful.

Summary

Based on the findings described above, we need to make some alterations to the delivery of the course content in BIOL2090 (specifically in experimental design). In this lower-level, survey course, the sole student was not able to perform to one of our set targets (direct knowledge assessment). More focus will be placed on information retention by students using techniques such as classroom flipping and repetitive exposure/quizzing on key concepts in these courses. As stated earlier, the Bachelor of

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Science in Applied Microbiology program is a new program at Northwestern State University. The Spring 2017 semester was the first semester in which students could declare a major in this program. At the conclusion of the Spring 2017 semester, there were only three Applied Microbiology majors. With increased enrollment, future results based on additional Student Learning Outcomes that map to higher level courses will be more meaningful, and the interpretation of the data will allow for better direction in terms of curriculum changes needed.