

Academic Program Details

Department/School: Biology and Chemistry

Degree: Bachelor of Science

Major/Program: Environmental Science

Assessment Period: 2010-2011 Academic Year

Date Submitted: June 1, 2011

Program Mission Statement

The mission of the **Biology** Department at PLNU coincides with the University mission to Teach, Shape, and Send.

To Teach: Our commitment is to provide students the opportunity to build a broad foundation in the major disciplines of biology, in the process of science skills, and in the critical thinking/quantitative skills that are required to apply their education to real world settings.

To Shape: In addition to the formal academic interactions, each student will have opportunities to enter into mentoring relationships with our faculty through advising, lab assisting, research experiences, and Departmental social functions. In these contexts, students can expect to dialogue about issues relating to their own personal and professional goals, the interface between biology and our society, and the relationship between faith and science.

To Send: The graduates of the Biology Department will be able to apply both their faith and education in biology related professions, such as medicine, allied health fields, education, or industry. They will feel confident that they have been well prepared to positively contribute in these fields and society in general.

The mission of the **Chemistry** Department at PLNU coincides with the University mission to Teach, Shape, and Send.

To Teach: Our commitment is to provide students the opportunity to build a broad foundation of knowledge and understanding of the discipline of chemistry, to develop skills in the process of science, and in the practice of critical thinking and quantitative analysis; skills that are required to apply their education to real world situations.

To Shape: In addition to the formal academic interactions, each student will have opportunities to enter into mentoring relationships with our faculty through advising, lab assisting, research activities, and departmental social functions. In this way we intend our student to grow and mature as professionals and as individuals, coming to understand team work and to value personal integrity. We also expect our students to be in dialogue with us about issues relating to their personal and professional goals, and the interface between science, society, and Christian faith.

To Send: The graduates of this department will be able to apply both their faith and scientific understanding to addressing real world problems in professions, such as medicine, allied health fields, education, and industry. They will feel confident that they are well prepared to make positive contributes in their world.

Outcome1

Program Intended Educational Outcome

Students will demonstrate an understanding of the process of science, and of the concepts and theories of biology across a broad range of organizational levels: molecular, cellular, organismal, and ecological.

Means for Assessment and Criteria for Success

1.a. Students will take the ETS Major Fields Test in Biology as part of the capstone course in biology, Biology 497, Biology Seminar. The overall group mean on the ETS exam will be ³ 75th percentile and at least 50% of our students will have an overall score ³ 60th percentile. Additionally, the same criteria established for the overall ETS score will be applied to each of the 4 sub-disciplines, which are *Cell, Genetic & Molecular, Organismal, and Population, Ecological, & Evolutionary Biology*.

1.b. In conjunction with the development of students' content knowledge and process of science skills, students' quantitative skills should also develop throughout the program. We use the ETS assessment indicator for quantitative skills to verify that these skills are in place by the time our students finish their education at PLNU. Since the Assessment indicator data is only given for the institution as a whole, this will be an average measure of how our department is doing in preparing students in this area as individual student data is not available. The overall group mean on the ETS exam for the quantitative assessment indicator will be $\geq 75^{\text{th}}$ percentile.

Summary of Data Collected

1.a. The overall group mean of the 4 students who took the exam was at the 90th percentile (**criteria met**). 80% of the students had an overall score ³ 60th percentile (**criteria met**). The overall group mean was at the 60th, 55th, 95th and 95th percentiles for each of the 4 sub-disciplines (**criteria not met for Cell or for Genetic & Molecular**). More than 50% of the students had an overall score ³ 60th percentile for all of the sub-disciplines except Cell and Genetic & Molecular (**criteria not met for Cell or for Genetic & Molecular**).

1.b. The overall group mean was at the 75th percentile (**criteria met**).

Use of Results

Since only 4 students took the ETS test, the data for PLO 1 is not statistically significant. Thus, we do not currently plan to change the program in any way. However, we do plan to make it a course requirement to take the ETS exam in the future, as several students did not take the exam. If students do not take the exam, they will receive a grade of NC for BIO497.

Outcome2

Program Intended Educational Outcome

Students will demonstrate a foundational knowledge of the principles of physical, organic, and inorganic chemistry, including the structure of matter, fundamental chemical reactions, and the factors that regulate such processes.

Means for Assessment and Criteria for Success

1. Students will be tested at various points in their college years to measure their acquisition of essential knowledge and understanding of certain areas of chemistry. Nationally normalized standardized exams prepared by the American Chemical Society will be used for this purpose. They will be administrated according to the following schedule:

End of General Chemistry Sequence General Chemistry ACS Exam

End of Analytical Chemistry Analytical Chemistry ACS Exam

2. Students took the ACS General Chemistry exam at the end of the General Chemistry sequence in the spring of 2011. The average score for the Environmental Science majors will be higher than the 50%tile.

Summary of Data Collected

Students took the ACS General Chemistry exam at the end of the General Chemistry sequence in the spring of 2011. The average score for the 4 Environmental Science majors was 28.0/70.0 (29%tile) (**Criteria Not Met** but too few students in the class for the data to be statistically significant).

Use of Results

The chemistry part of the joint major curriculum will undergo a significant change next year. After surveying the programs of twenty other comparator schools we decided to bring our offerings more in line with the majority of those schools by consolidating the organic chemistry experience into the sophomore year and slightly expanding the amount of analytical chemistry we require. This results in a corresponding reduction in the elective units. We will track ACS exam scores into the future to see if this change strengthened the majors that depend on these courses.

Outcome3

Program Intended Educational Outcome

Students will understand the basic techniques of chemical investigation and the fundamental principles and operating procedures of the major instruments used in chemical characterization and analysis.

Means for Assessment and Criteria for Success

Assessment tools yet to be designed; Criteria not yet determined

Summary of Data Collected

PLO not assessed 2010-11

Use of Results

Data will be collected and analyzed on these in the future

Outcome4

Program Intended Educational Outcome

Students will participate in the life of the departments of Biology and/or Chemistry by involvement in science clubs and/or in various positions of responsibility such as graders, tutors, and teaching assistants.

Means for Assessment and Criteria for Success

Assessment tools yet to be designed; Criteria not yet determined

Summary of Data Collected

PLO not assessed 2010-11

Use of Results

Data will be collected and analyzed on these in the future

Outcome5

Program Intended Educational Outcome

Students will develop career goals and define a path by which to achieve these goals.

Means for Assessment and Criteria for Success

Assessment tools yet to be designed; Criteria not yet determined.

Summary of Data Collected

PLO not assessed 2010-11

Use of Results

Data will be collected and analyzed on these in the future

Outcome6

Program Intended Educational Outcome

Students will develop a rationally defensible integration of science and faith, particularly with regard to environmental stewardship

Means for Assessment and Criteria for Success

Assessment tools yet to be designed; Criteria not yet determined

Summary of Data Collected

PLO not assessed 2010-11

Use of Results

Data will be collected and analyzed on these in the future

Outcome7

Program Intended Educational Outcome

Students will gain entry to professional or graduate schools, or to science-related careers.

Means for Assessment and Criteria for Success

Data yet to be analyzed; Criteria yet to be determined.

Summary of Data Collected

PLO not assessed 2010-11

Use of Results

Data will be collected and analyzed on these in the future