

Biology-Chemistry B.S.  
Annual Assessment Report  
Departments of Biology and Chemistry  
2010-2011

**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.

**Program Learning Outcomes:**

- 1) 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, and organismal.
- 2) Students will demonstrate a foundational knowledge of the principles of physical, organic, analytical, and inorganic chemistry, including the structure of matter, fundamental chemical reactions, and the factors that regulate such processes.
- 3) 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.
- 4) 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.
- 5) Students will develop career goals and define a path by which to achieve these goals.
- 6) Students will develop a rationally defensible integration of science and faith.
- 7) Students will gain entry to professional or graduate schools, or to science-related careers.

## Curriculum Map:

See attached spreadsheet.

## Multi-Year Assessment Plan:

Our departments are still in the process of developing this plan.

## Assessment Activities:

### PLO 1

- 1) Students will take the ETS Major Fields Test in Biology as part of the capstone course in biology, Biology 497, Biology Seminar.

Criteria for success: The overall group mean on the ETS exam will be  $\geq 75^{\text{th}}$  percentile and at least 50% of our students will have an overall score  $\geq 60^{\text{th}}$  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*, and *Organismal*.

Results: The overall group mean of the 4 students who took the exam was at the  $65^{\text{th}}$  percentile (**criteria not met**). 50% of the students had an overall score  $\geq 60^{\text{th}}$  percentile (**criteria met**). The overall group mean was at the  $75^{\text{th}}$ ,  $50^{\text{th}}$ , and  $85^{\text{th}}$  percentiles for each of the 3 sub-disciplines (**criteria not met for Genetic & Molecular**). More than 50% of the students had an overall score  $\geq 60^{\text{th}}$  percentile for all of the sub-disciplines except Genetic & Molecular (**criteria not met for Genetic & Molecular**).

- 2) 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.

Criteria for success: The overall group mean on the ETS exam for the quantitative assessment indicator will be  $\geq 75^{\text{th}}$  percentile.

Results: The overall group mean was at the  $75^{\text{th}}$  percentile (**criteria met**).

### PLO 2

- 1) Students will take the ACS General Chemistry exam at the end of the General Chemistry sequence.

Criteria for success: The average score for the Biology/Chemistry majors will be higher than the 50th percentile.

Results: The overall group mean was at the  $55^{\text{th}}$  percentile (**criteria met**).

- 2) Students will take the ACS Organic Chemistry exam at the end of the Organic Chemistry sequence.

Criteria for success: The average score for the Biology/Chemistry majors will be higher than the 50th percentile.

Results: The overall group mean was at the 53<sup>rd</sup> percentile (**criteria met**).

- 3) Students will take the ACS Thermodynamics exam at the end of Physical Chemistry I
- Criteria for success: The average score for the Biology/Chemistry majors will be higher than the 50th percentile.

Results: The overall group mean was at the 54<sup>th</sup> percentile (**criteria met**).

#### PLO 3-6

- 1) Assessment tools yet to be designed

Criteria for success: Criteria not yet determined

Results: PLO not assessed 2010-11

#### PLO 7

- 1) Data yet to be analyzed

Criteria for success: Criteria yet to be determined

Results: PLO not assessed 2010-11

#### Summary of Data Collected and Use of Results:

Only PLO1 and 2 were assessed this year. These data will be discussed at departmental meetings in the fall.

PLO 1: 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.

PLO 2: 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.

PLO 3-7: Data will be collected and analyzed on these outcomes in the future.