

## Evidence of Student Learning: Biology-Chemistry Majors

PLO 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.

- 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 the 3 sub-disciplines, which are *Cell*, *Genetic & Molecular*, and *Organismal*.

Results: The overall group mean of the 16 students who took the exam was at the 82<sup>nd</sup> percentile (**criteria met**). 44% of the students had an overall score of 60<sup>th</sup> percentile or greater (**criteria not met**). The overall group mean was at the 93<sup>rd</sup>, 83<sup>rd</sup>, and 78<sup>th</sup> percentiles for each of the 3 sub-disciplines (**criteria met**). 56%, 44%, and 50% of the students had an overall score of 60<sup>th</sup> percentile or greater for each of the sub-disciplines (**criteria met for *Cell* and *Organismal* but not 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 82<sup>nd</sup> percentile (**criteria met**). These data are not able to be disaggregated by major but include all of our majors (BBA, BBS, BCBS, ENV).

PLO 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.

- 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.

- 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.

- 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.

The Chemistry Department provides these data and their analysis.

PLO 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.

- 1) Assessment tools yet to be designed.  
Criteria for success: Criteria not yet determined.

PLO 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.

- 1) Student participation in Biology/Chemistry clubs and in positions of responsibility will be tracked and recorded.  
Criteria for success: At least 80% of our students will participate in one of these positions during their time at PLNU.

Results: Data not gathered this year.

PLO5: Students will develop career goals and define a path by which to achieve these goals.

- 1) In order to be cleared for course registration each semester, students will answer a questionnaire regarding their career goals and their plan by which to achieve those goals and then discuss the questionnaire with their faculty advisor.  
Criteria for success: At least 90% of our students will participate in this questionnaire each semester.

Results: Data not gathered this year.

PLO6: Students will develop a rationally defensible integration of science and faith.

- 1) During their senior year, students will defend the integration of their faith with various scientific topics via written and oral presentations.  
Criteria for success: At least 60% of our students will score at the strong level (levels: beginning, developing, strong, mature).

Results: Of the 16 students who wrote the essays, all were at the strong or mature level (**criteria met**). These data are a little difficult to believe, so we will be switching to a new rubric next year.

PLO 7: Students will gain entry to professional or graduate schools, or to science-related careers.

- 1) After graduation, alumni will be tracked and data regarding their postgraduate education and profession will be recorded.

Criteria for success: Success rates for alumni who apply for graduate or professional schools will be > 75% and the percentage of graduates who obtain jobs in science-related occupations will be >70%.

Results: This is assessed every 5 years.