

## Biology-Chemistry BS

### Multi-year Assessment Plan as of Oct. 2011

#### 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 be able to 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.
3. Students will understand the basic principles and operating procedures of the major instruments used in chemical characterization and analysis.
4. Students will participate in the life of the department in Biology/Chemistry clubs 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.

#### Program Assessment Plan

PLO	When to Assess*	What direct and indirect evidence to collect	Who will collect the evidence	How evidence will be assessed	Criteria for success	How decisions will be made
1	Every year	Students will take the ETS Major Fields Test in Biology as part of the capstone course in biology, BIO 497.	The exam will be administered by the instructor of BIO497 and the data will be collated by the Department Chair.	Scores will be determined by ETS.	The overall group mean on the ETS exam will be >75th percentile and at least 50% of our students will have an overall score > 60th percentile. Additionally, the same criteria established for the overall ETS score will be applied to each of the 3 sub-disciplines, which are Cell, Genetic & Molecular, and Organismal Biology.	The Department faculty will examine the data annually and discuss the long-term trends. For example, a trend of low scores in the Organismal Biology sub-section caused us to create a new required course for the curriculum.

2	Every year	Students will take various ACS standardized exam at the end of major course sequences and take the ETS Major Fields Test in Chemistry as part of the Chemistry Seminar course in their senior year.	The exams will be administered by the course instructors and the data will be collated by the Department Chair.	Scores on the ACS and ETS exams will be compared with those earned but chemistry majors at other institutions via the established national norms.	The overall group mean on the ACS exam will be at or above the 50 <sup>th</sup> percentile and the group mean on the ETS exam and each of its subsections will be >75th percentile and at least 50% of our students will have an overall score > 60th percentile.	The Department faculty will examine the data annually and discuss the long-term trends. Since we may have only small groups taking the ETS exam each year. The data for several years will need to be aggregated before any definite conclusion can be drawn.
3	Every year	Faculty laboratory instructors will observe their lab TA's demonstrating various pieces of laboratory equipment and verify that they have an accurate understanding of its operation. Students working in the summer research program will a particularly advanced understanding of the instruments they have used. (GC, HPLC, NMR, UV-vis, GCMS, etc)	Faculty laboratory instructors and research mentors will collect the names of those students with these competences. These will be passed along to the Department Chair who will maintain the data.	Faculty laboratory instructors and research mentors will assess the level of expertise of their student TA of researcher according to a departmental developed rubric.	At least 75% of the department's graduates will achieve expert user status on at least one instrument. At least 50% of the chemistry major graduates will have worked intensely with at least one instrument in the summer undergraduate research program.	The Department faculty will examine the data annually and discuss the long-term trends.
4	Every year beginning in Fall, 2012.	Students will report on club participation, tutoring, grading, and TA responsibilities as part of the capstone course in biology, BIO 497.	A spreadsheet report will be administered by the instructor of BIO497 and the data will be collated by the Department Chair.	The percentage of student participation in various activities will be recorded from the spreadsheet.	At least 80% of our students will participate in one of these positions during their time at PLNU.	The Department faculty will examine the data annually and discuss the student participation trends.

5	Every semester beginning in Fall, 2012.	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.	Every faculty advisor in Biology will collect these data.	Individual student progress will be assessed by each faculty advisor.	100% of the students will submit a plan. This will be enforced because students will not be cleared for registration unless they submit this plan to their faculty advisors.	Individual student progress and any required intervention strategy will be decided by each faculty advisor.
6	Every year beginning in Fall, 2012.	Students will defend the integration of their faith with various scientific topics via written and oral presentations as part of the capstone course in biology, BIO 497.	The instructor of BIO497 will administer the assignments.	The instructor of BIO497 will assess the presentations via a rubric. The data will be collated by the Department Chair.	At least 80% of our students will score at the Adequate level on the rubric for integration of their faith with science.	The Department faculty will examine the data annually and discuss the level of integration attained by the students.
7	Every 5 years	After graduation, alumni will be tracked and data regarding their postgraduate education and profession will be recorded.	These data are collected by a Biology professor, Michael McConnell, who is also a liaison with the Biology/Chemistry alumni organization.	The percentages of students in various types of education or occupations will be recorded by Michael McConnell.	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%.	The Department faculty will examine the data every 5 years and discuss the long-term trends. As an example, we regularly collect these data for presentation to external funding agencies, such as NIH, NSF, and HHMI.