Form E-1-A for Boston College Departments/Programs

Department/Program  Chemistry  2016

1) Have formal learning outcomes been developed? What are they? (What specific sets of skills and knowledge does the department expect its majors to have acquired before they graduate?)

   Learning Outcome I
   Senior chemistry majors will be able to demonstrate a mastery of factual knowledge comprehensively across the five principal areas of chemistry (organic, inorganic, physical, biochemistry and analytical), and be able to analyze and solve problems, understand relationships, and interpret scientific facts and data.

   Learning Outcome II
   Chemistry Majors will gain proficiency in basic laboratory techniques and experience with modern lab instrumentation.

   Learning Outcome III
   Graduates of the BS Chemistry Major will be successful in gaining entrance into high quality graduate schools in chemistry, admission to professional schools, and securing quality careers in the chemical sciences.

   Learning Outcome IV
   Senior chemistry majors in the ACS Certification Track will be able to demonstrate ability to integrate chemical knowledge in the successful conduct of undergraduate research projects as well as work well in team-based research.

2) Where are these learning outcomes published? Be specific. (Where are the department’s learning expectations accessible to potential majors: on the web or in the catalog or in your dept major handouts?)

   A link labeled Learning Outcomes on the webpage for Chemistry Major Degree Requirements (http://www.bc.edu/schools/cas/chemistry/academics/undergrad/learning.html) brings up a list of the Learning Outcomes. They are also listed on the Chemistry Advising Guidelines handout that is given to every student when s/he declares Chemistry as the major and is also emailed to all majors and advisors annually in the fall.

3) Other than GPA, what data/evidence is used to determine whether graduates have achieved the stated outcomes for the degree? (What evidence and analytical approaches do you use to assess which of the student learning outcomes are being achieved more or less well?)

   The Diagnostic of Undergraduate Chemistry Knowledge (DUCK) exam, published by the American Chemical Society (ACS), is given to graduating Chemistry majors annually on the Saturday before the last day of classes. The aggregate data that results from these exams is analyzed.

   The Undergraduate Studies Committee conducts a survey of all graduating seniors concerning career plans, both immediate and long term. There are plans to supplement these with alumni surveys.
An annual comparison of teaching laboratory instrumentation with industry standards is conducted.

4) **Who interprets the evidence? What is the process?** (Who in the department is responsible for interpreting the data and making recommendations for curriculum or assignment changes if appropriate? When does this occur?)

Undergraduate Studies Committee members (Lynne O’Connell, David McFadden, Ross Kelly, Mary Roberts, Ken Metz and Dan Fox) examine aggregate data from the DUCK exams. The 2008 version of the DUCK exam was given to students in 2012 and 2013, and the 2013 version of the exam was given in 2014 and 2015. Questions with a high occurrence of incorrect responses are flagged, and their relevance to our department’s learning objectives is discussed. This year, the 2008 version was given to students, and the data obtained was compared with the data obtained in 2012 and 2013 to see if there was an improvement.

The Exit Surveys have been compiled annually since 2011 by the Chair of the Undergraduate Studies Committee, Lynne O’Connell.

Laboratory coordinators, Ken Metz, Lynne O’Connell and Christine Goldman, discuss the instrument deficiencies of the teaching labs and communicate these needs to the departmental Instrumentation Committee every fall when capital equipment purchases for the department are decided.

Surveys containing questions about the physical design of the General, Honors, Analytical and Inorganic laboratories were distributed to the students in April 2013 (pre-renovation) and in December 2013 and April 2015 (post-renovation). The data gathered was analyzed and interpreted by the Lab Director (Lynne O’Connell) and distributed to architects and capital project personnel.