

Unit Plan for Assessing and Improving Student Learning in Degree Programs

Unit: Chemistry
Unit Head approval:

Date: 4/16/08

SECTION 1: PAST ASSESSMENT RESULTS

Brief description of changes or improvements made in your unit as the result of assessment results since 2000.

All of the General Chemistry courses (Chemistry 101, 102, 103, 104, 105, 202, 203, 204, 205) now have on-line components. For example, the lecture courses all utilize on-line homework, while the lab courses also have on-line quizzes.

The organic teaching laboratories have undergone a major redesign. This includes new laboratory facilities and equipment, along with new laboratory experiments.

SECTION 2: REVISED ASSESSMENT PLAN

(a) PROCESS: Brief description of the process followed to develop or revise this assessment plan.

Steve Zimmerman appointed Don DeCoste, Interim Director of General Chemistry to Chair the Outcomes Assessment Committee. Various people in chemistry were contacted to be a part of this committee. These include: Jim Lisy, Professor; Patricia Phillips-Batoma, Computer-Assisted Design Specialist; Alex Scheeline, Professor; and Pat Shapley, Professor. The committee met during the Fall 2007 semester to discuss assessment of the Chemistry program. The previous Outcomes Assessment Plan was addressed, with minor modifications to the student outcomes. The Committee evaluated the current chemistry curriculum match with outcomes with specific courses.

In reviewing the student outcomes from the previous Outcomes Assessment Committee, the current Committee decided that, while the outcomes are met by the students in the Specialized curriculum, this is not necessarily the case with the Science and Letters majors. The Science and Letters majors are generally not on a track to become professional chemists, and if they are, they will be advised to take courses that meet these outcomes. That said, it is the advice of this Committee that we revisit the curriculum for Science and Letters majors as it is now quite unstructured.

In addition, new measures and methods were discussed to measure the outcomes (as listed below in section 2c).

(b) STUDENT OUTCOMES: List Unit's student learning outcomes (knowledge, skills, and attitudes).

- Outcome 1:** A thorough knowledge of the basic principles of chemistry, including atomic and molecular structure, chemical dynamics and the chemical and physical properties of substances.
- Outcome 2:** A thorough knowledge of the subfields of chemistry, including analytical, inorganic, organic and physical chemistry.
- Outcome 3:** A thorough knowledge of cognitive areas such as mathematics and physics to facilitate the understanding and manipulation of fundamental chemical theories.
- Outcome 4:** The ability to design experiments and to use appropriate experimental apparatus effectively.
- Outcome 5:** The opportunity to pursue an individualized research experience as an undergraduate.
- Outcome 6:** The ability to read, evaluate and interpret numerical, chemical and general scientific information.
- Outcome 7:** The ability to communicate effectively both verbally and in writing.
- Outcome 8:** The expectation that students will be broadly educated in areas outside of science.
- Outcome 9:** The opportunity to acquire the knowledge and skills needed to succeed in the workplace or in professional school after graduation.

(c) MEASURES AND METHODS USED TO MEASURE OUTCOMES:

1. There are existing survey instruments that will be of use to measure the outcomes. These include:
 - ICES Evaluations
 - Chancellor's Senior Survey on the Undergraduate Experience
 - Course Grades (with additional focus on individual exams and laboratory reports)
 - GRE scores (both general and chemistry, when applicable)
2. New survey instruments should also be employed. These include:
 - Formative on-line survey of current majors. Majors will be surveyed at the end of each academic year. Students will be asked about the usefulness of the courses they have taken and the effectiveness of the instructors. The survey will include rating types of questions and open-ended questions.
 - Exit survey for chemistry majors.
 - Survey of major employers of UIUC Chemistry Graduates to determine adequacy of undergraduate preparation for industry.
 - Survey of graduates 1-3 years after graduation.
 - Faculty survey. The faculty survey will include rating types of questions and open-ended questions.
3. Annual Report of Placement Director detailing where our graduates will be employed or what professional school they will attend, as a measure of general success of preparation, and an indicator that graduates are prepared to work in their chosen field.

SECTION 3: PLANS FOR USING RESULTS

(a) **PLANS: Brief description of plans to use assessment results for program improvement.**

An annual report incorporating the results from section 2 will be assembled by the Outcomes Assessment Committee and presented to the Department Head who will disperse the results to the Faculty. The Outcomes Assessment Committee will make specific recommendations to the Head for addressing issues that arise from the assessment of the learning outcomes.

(b) **TIMELINE FOR IMPLEMENTATION**

The new surveys will be developed over the next year. The final plan will be in place by April 30, 2009.