

Annual Assessment Report
Chemistry Major
2015

I. Executive Summary

General Chemistry/Chemical Analysis

The biggest problem I have been facing with these two courses has been how to deal with increased enrollments. Historically 25-30 students have taken the first course, but over the past two years this has risen to the 50-60 range. These are not simple lecture courses, and so there is the problem of scale.

One way that I have attempted to deal with this problem has been changing textbooks. This year I returned to using Kotz et al., Chemistry & Chemical Reactivity. This had been a favorite text of mine in the past, but had over the years become too expensive. With the current 9th edition the textbook is published in a less expensive Hybrid format, with a paper text for all chapter readings, but with all end-of-chapter questions (and other materials) being available in digital format; students can also opt for a fully digital version. It is the digital additions which are helping me in dealing with increased enrollments. The textbook comes with a subscription to the publisher's OWL (Online Web-based Learning) System. In OWL I can select specific problems from the end-of-chapter questions, along with other "mastery" exercises, and have them assigned at specific times (they appear on the student's OWL account at the end of a given lecture period) and also due at certain times (typically before the following class session). While working on each of these problems the student can access a digital copy of their textbook, along with other digital tutorials. Upon submission of answers, the student receives immediate feedback as to whether their work is correct or not; for many questions multiple attempts are possible. This has cut down the amount of time we have spent in class on "trivial" questions and has allowed us to focus on those concepts which the students really don't understand. I have continued to give in-class quizzes on top of the OWL work, but I may try online quizzes in the future. I will certainly continue to utilize OWL this coming year and may even expand its use.

A second way that I have attempted to deal with the larger class size is by purchasing a "Smart Pen," and posting "Pencasts" on Moodle. A Pencast is a recording (in real time) of both what is being written on a piece of paper and any narration that is accompanying that writing. I have recorded and posted a number of Pencasts (e.g. How to Draw a Lewis Dot Structure, or How to Solve a Limiting Reagent Problem) for students to access. Thus, if a student has a concern about one of these topics they can "watch" me walking through the problem for them. In this way I can record the tutorial once and it can be seen by multiple students and over multiple years. I have started with just a few of these Pencasts this year, but hope to add to the collection over the summer.

Instrumental Methods.

In a similar manner to General Chemistry, I returned to a previously favorite, but expensive, textbook after several years using a different text. This new 8th edition of Silverstein et al., Spectrophotometric Identification of Organic Compounds, was available for the first time in a fully digital format and thus was of a relatively reasonable price for students. I had found myself utilizing this text for handouts the past several years and so it made sense to return to it as the primary text.

This year's course has led me to conclude that we are sorely in need of new instrumentation. The NMR (nuclear magnetic resonance) instrument, which is a workhorse for the course (used in almost half the labs), stopped working properly on the first day of lab. I was able to cobble together a repair that lasted until about midterm, but it was only at that point that I was able to find the root cause of the problem, which was fixed by the purchase of a new pump (\$500) for the instrument. Our c. 20 year old UV/vis and

IR spectrophotometers are pretty much worthless now, and my electrochemical instrument (c. 25 years old) is on its last legs and no longer supported by the manufacturer. It also required some jerry-rigging in order to be useful this year.

Bioinorganic.

This past summer I participated in a VIPER workshop (Virtual Inorganic Pedagogical Electronic Resource) on Bioinorganic Chemistry, where I both contributed ideas and learned new teaching ideas for this course. I introduced many of these new activities to this course. As with my other courses, I chose a new textbook. The textbook I had used in the past has gotten a bit out of date and is also really aimed at a graduate level audience. The new textbook, Rehder's Bioinorganic Chemistry, appears to be more approachable by undergraduates. I supplemented this text with many readings from the primary literature.

Organic Chemistry I/Organic Chemistry II/Biochemistry

With the precipitous resignation of Lauren O'Neil in the fall, we went into survival mode for these courses. We were able to hire a replacement fairly quickly, but have done nothing much more than ensure that they were functioning. One decision we did make this year was to offer Biochemistry on an annual basis, rather than every other year as in the past. Enrollments (17 this semester, and 22 signed up for this coming fall) would seem to indicate that this was a needed move.

Fortunately we have been able to hire a full time tenure-track replacement in Organic and Biochemistry starting this coming fall. In making this hire we did take into account the increased interest by Chemistry and BMB majors in the health professions and found someone whose background is more towards Biochemistry (as opposed to pure Organic Chemistry) and who could teach a courses of interest to these students. We are looking forward to her starting in the fall. I am pleased that she has already begun preparing for these courses and I have encouraged her to be creative with these courses and make them her own.