Formal teaching assignments

Fall, 2008: **Chemistry 210** *Structure and Reactivity I*

Students: One section of 400 first-year students (in a course of 1400; 41 lecture periods, faculty-led discussion). *Structure and Reactivity* is a first-term chemistry course, based on organic chemistry, for entering students with a reasonable high school preparation. Working with first-term, first-year students in this subject is a fabulous opportunity to introduce them to a scientific subject area that is not a general survey, but something where contemporary, meaningful, real-life understanding of relevant topics (health, nutrition, disease, drugs) can be put front-and-center.

The testing in Chemistry 210 is worth noting. Regardless of the size of this class, we are committed to providing a strong and authentic problem-based approach. To that end, the exams questions are primarily designed by providing students with experimental data taken from recent journal articles, and recasting this information into a form that can be solved by our students. Far from memorization and recall, these problems can only be solved by the application of general principles to these new and unfamiliar settings.

When totaled up, the Chemistry 210 students have access to around 12 different resources that they can chose from in order to find just the right match that will yield success; these include a visually enhanced set of podcasts of the entire course from a term in which I taught it, which serves as a complement to the course, and a resource regardless of whether I happen to be teaching the course. We also have a set of student-generated enhanced podcasts, where students have scripted and recorded 3-5 minute solutions to selected programs from last year's examinations.

Winter, 2009: **Chemistry 216** *Structure and Reactivity Laboratory II (Projects Oriented Section)*

Students: In the second semester, there is a special section of 96 first-year students who are co-enrolled in an integrated lab/lecture offering of *Structure and Reactivity.* Our goal is to gather together that subset of students who are motivated by and interested in science (and we can pull this off on a fairly large scale), and give them a highly research-based experience in both parts of the course. In the laboratory, we start off the first half of the term with some short projects that allow a high degree of student design, but still focus them on a set of common techniques and laboratory strategies (separation, identification, preparation). For example, instead of giving students a mixture and a set of directions for how to separate it, which is a classic exercise in organic laboratory, we turn this on its head a bit: students are presented with a set of 40 pure substances. Their task is to make a binary mixture that can be separated later (not always easy… in the classic exercise, the interesting bits were all done in the stockroom). They devise a procedure, demonstrate its effectiveness, then pass that off to other students to test. During the first part of the term, they are also working in teams to generate proposals for novel, 3-step synthetic sequences. They draft these, get feedback, refine them, and then the class reviews them using the sort of criteria one might use on any scientific review panel.

The best four of these are then selected, and these experimental procedures constitute the syllabus for the second half of the term. With a friendly competition, the section of the course that makes the greatest progress on accomplishing the four of these procedures wins a bragging-rights trophy, so the sections of the course end up comprising 16-person teams who need to approach the strategic design problem of how they think they can make the most progress.

Winter 2009: **Chemistry 720** *Chemical Sciences at the Interface of Education*

Students: Eight first-year graduate students (13 2-hr discussion periods). This seminar is designed for graduate students in chemistry to explore the undergraduate teaching aspect of becoming faculty

members. In this course, I provide a mechanism for extending instructional development. In addition to readings and reflective writings, students collaborate with a chemistry faculty member to design a teaching project for the department that can be implemented, assessed and documented at a subsequent time. Students are co-registered in a School of Education cognate course such as *Designing Science Learning Environments, Assessment*, or *Educational Foundations*.

Other teaching activities

Summer 2008: Summer Science Camp for Cass Tech, a Detroit High School.

In 2008, I designed, along with two undergraduate instructor/collaborators, a 2-week (60 hour) summer science camp for 24 students from Cass Tech, and inner city Detroit High School. These students stayed on campus for a full range of activities, the centerpiece of which was that they learned a reasonably high level topic using the same teaching materials and lessons we use for our Honors students on the topic of Nuclear Magnetic Resonance spectroscopy. By the end of two weeks, the students developed a baseline mastery of this topic, collecting and analyzing data from laboratory experiments that they had carried out, and ended with a poster session where they presented their ideas to a group of graduate students and faculty from the department of chemistry.

Fall 2008 & Winter 2009: Teaching mentor for "Research & Education" post-doctoral fellows.

In 2002, I introduced a dual-mentorship (in research and in education) post-doctoral program into the department as a part of the future faculty development program. I meet weekly with post-doctoral associates teaching in these courses.

F08-W09: Dr. Sam Pazicni: **Chemistry 260** *Physical Chemistry* – evaluation project (125 students)
W09: Dr. Lori Lee: **Chemistry 215** *Structure and Reactivity II* (1000 students)

Fall 2008: *Supervision of the Studio Option for Honors Chemistry 210*: ca. 160 students participate in a 2-hr/wk supplemental instruction option done in a studio format. I supervise the 8 undergraduate peer leaders.

Winter 2009: *Supervision of the Studio Option for Honors Chemistry 215*: ca. 90 students participate in a 2-hr/wk supplemental instruction option done in a studio format. I supervise the 6 undergraduate peer leaders.

Winter 2009: *Supervision of the Studio Option in the regular Chemistry 215 course*: ca. 80 students elect a 2-hr/wk supplemental instruction option done in a studio format. I supervise 4 undergraduate peer leaders.