Michael Dewar's Teaching Statement

PHILOSOPHY

My guiding principle when I teach is to discern the needs of my students and to determine the most appropriate way to address these needs. This principle affects the way I structure a course, organize my lectures, and prepare exams.

It is important to tailor a course for the audience. The style of teaching in a lower-division mathematics class for non-majors *must* be different from a graduate-level course. Whereas students in the latter type of class will be more likely to share the instructor's enthusiasm for the content and willing to follow abstract developments for a longer period of time, students in the lower-division class may struggle to see the relevance, applicability, and beauty in the subject. This presents a wonderful challenge which the knowledgeable instructor is more than ready to meet. The syllabi for freshman and sophomore classes have already been distilled over many years to contain powerful tools with wide applicability. It is the instructor's job to draw attention to these applications. One of my favorite ways to do this is by assigning in-depth projects which work through extended applications step by step. When the situation permits, I like to organize the course so that there are weekly problem sessions in which students work in small groups on these sorts of projects. Aside from the benefit of providing powerful applications, having students work in groups allows them to learn from each other. Group work thus partially remedies the problems that can arise from students having disparate mathematical abilities and backgrounds.

During lectures I endeavor to distill the material into a form which the students are ready to absorb. It is not always advantageous to present rigorous answers to questions which the students are not yet prepared to even ask. For example, in a first calculus class, students do not need to hear about the full gallery of horrible functions from an analyst's book of counter-examples. However, they do need to check if their function is defined over the entire interval of integration. It is thus entirely appropriate to warn students against an error like

$$\int_{-1}^{1} \frac{1}{x^2} dx = -\frac{1}{x}\Big]_{x=-1}^{x=1} = -2.$$

Textbooks usually already contain all of the technical details as well as a leisurely development of the concepts with several examples slowly guiding the way. During a lecture, the teacher's job is to draw attention to the key elements, show their interconnectedness, and provide salient examples.

It is imperative that exams fairly test the material that was actually covered in class and in the assignments. If a student knows the core material and can apply it in situations resembling those from the lectures and homeworks, that student ought to be able to complete the vast majority of the exam. Some part of the exam might need to be more challenging in order to separate the A's from the B's. However it is unfair to structure too many questions which require consecutive leaps of insight.

EXPERIENCE

During my time at the University of Illinois, I have been the principal instructor for a course eleven times. I have taught calculus, linear algebra, finite mathematics, and actuarial mathematics. For these courses, I have been responsible for all aspects of teaching, including lecturing, assigning and grading homework, setting exams, and assigning grades. I received an honorable mention for a department teaching award in 2007-2008, and I won the award the following year. I was a leading departmental candidate for a nomination for a university-wide teaching award in two consecutive years. The scores from my students' evaluation forms frequently put me on the university-wide List Of Teachers Ranked As Excellent By Their Students.

I have experience with many different teaching formats:

- Traditional Lecture: Nine times (over three different courses) I taught using regular chalkboard lectures.
- Active Learning: I am currently teaching Calculus 2 using brief, ten-minute introductory lectures and lots of group work on problems. This method features daily feedback both in-class and from the graded assignments.
- Calculus & Mathematica: I taught linear algebra using Mathematica software. Students worked through detailed examples and submitted extensive group work assignments. I periodically lectured on the material. Most of my explanations were one-on-one and occurred as students were in the midst of completing their projects.
- Laboratory: I have taught four sections of future elementary school teachers. Students worked in groups and I gave mini-lectures throughout the lab session to explain the relevant concepts.
- Recitation: I have run discussion sections to supplement a main lecture. These sessions involved preparing lectures based on examples and homework problems and answering a myriad of student questions.

In the fall of 2008 I was a departmental mentor for four new teaching assistants. My initial duties were related to the new student orientation. Afterwards, I observed my mentees' teaching throughout the semester, discussed their progress and struggles, and helped them review the official and unofficial feedback from their students.