Statement of Teaching Philosophy

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I am committed to the liberal arts model of math instruction. I work to make my classroom a space where everyone is comfortable, welcome, and free to contribute to the class environment. I focus not on mechanical calculation, but on good communication of mathematical ideas and on clear and critical thinking about the world around us.

In all of my classrooms I foster a welcoming and inclusive environment. It's important to make sure **every student is involved in the class**, and has space to speak up and ask and answer questions. (This sometimes involves subtly discouraging some people from speaking up quite so much—or quietly talking to them after class and asking them to leave space for other students to participate).

During my classes I regularly ask questions of the class, and make sure that I get answers from many different students. If I get conflicting answers I'll often ask the students to work out which one is correct. I also pause frequently for questions from my students; and I pay enough attention to the room to tell when people are confused or have something to say even when they're nervous to speak up.

This **active creation of space** for everyone to participate is especially important to support members of underrepresented groups, who are often implicitly excluded from full participation. I am especially pleased wtih my consistent successes at engaging women students, who are too often not supported in STEM fields. In my classrooms the most active participants are often women, including women from ethnic minorities.

One of my proudest moments in my first couple of years teaching was having a group of female students come to me for help, because they felt like I was the professor who supported women STEM majors; I spent a semester helping them navigate major and career issues that they felt were not being dealt with effectively by others.

The most personally rewarding and probably the most important part of my job is **personal, individual contact with students**. Chambliss and Takacs' *How College Works* reports that the biggest effect a professor can have is through a direct personal conversation that makes the student feel genuinely understood; I work hard to create these connections whenever possible.

In lab sections in class, and in the more than ten office hours I hold in a typical week, I engage with each student personally and make sure to talk to them about what they feel and what they need. And in return, my students feel comfortable coming to my office to discuss their problems, whether academic or non-academic; I regularly spend time in my office working with students who are no longer in my class (or in some occasions have never taken classes with me!) but feel that I will do a good job of addressing their concerns.

Many times students have told me—personally and through teaching evaluations—that I made math interesting and compelling to them in a way no other instructor had. They are often surprised and gratified that I know exactly who all of them are, by name and by face, and am aware of their individual needs. One student this term thanked me for being the only math professor she has had to made the effort to explain concepts in many different ways, working to find an explanation that actually worked for her.

In my calculus and other lower-division courses, I prioritize helping my students engage with mathematical ideas critically and inquisitively, and understand not only how to do calculuations, but why we are doing them and what they mean.

When introducing new concepts, I lead with examples rather than theory: without concrete

examples it's difficult to understand what purpose the algebraic manipulations we're doing serve. I especially like to leverage the computer lab sections that come attached to Occidental's calculus courses: I will spend a lab period letting my students play around with graphical and numerical examples, so that when I explain the theory and algorithms in a future lecture they will have reference points to connect with.

I frequently consult with researchers and industry workers in other fields to find out what knowledge and techniques are actually important and commonly used. Most of my students won't become math majors; I want to focus on aspects of the course that will be most useful to them, and that requires knowing which aspects are useful! In particular, conversations with physicists and engineers have led me to focus heavily on linear approximation in Calculus I, Taylor approximations in Calculus II, and manipulating eigenvectors in Linear Algebra.

In my upper division classes I focus on **understanding the structure of proofs**, and on **clear writing and communication** of mathematical ideas. Math is a fundamentally communicative activity, and the ability to express mathematical ideas clearly is an important part of both a mathematical education and a liberal arts education.

In lectures, I make sure that my students not only know what the proof of a result is, but how we found the proof and why it works. I avoid presenting proofs as fully formed jewels—instead stopping to ask my students to remind me what exactly we're trying to prove, and what the terms we're using mean, and to ask them to figure out the next steps. This also maintains student engagement and buy-in since it makes them active participants in the lectures, rather than passive recipients of knowledge.

I structure my assigments to help my students develop as writers and communicators. Each week I assign a "redo" problem which I grade for clarity and writing style as well as correctness, and which my students can submit as many times as they like. This creates an **editing and feedback loop** that helps my students to learn from their mistakes andunderstand what makes for effective written communication. This process also creates the experience of writing repeated drafts with editorial feedback, which is good preparation for writing in an academic or professional setting.

In many of my courses I assign a paper or a presentation. I provide **clear and detailed rubrics** so my students understand exactly what is expected of them, and know what skills are important to focus on.

For these papers I follow the same principle of inviting multiple drafts with detailed feedback. I typically require my students to submit a draft, to which I give detailed feedback and assign a complete rubric-based grade; I then require my students to submit a second draft which incorporates that feedback. Many students have told me how helpful this was in learning how to write; one has told me that the paper she wrote for me is the single thing she has done in college that she is most proud of.

In addition to giving detailed editorial feedback, I work to incorporate as much **peer feedback** as possible. I have had good results with moderating writing peer review circles, where each student brings in a writing sample and gets critiques from 2-3 other students in the class. When I have my students give presentations I require other students to submit feedback. This is helpful to the presenters, who get more than one perspective on their talks; it also benefits the students giving the feedback, who practice critically evaluating presentations and thus learn more about how to give good talks themselves.