Teaching Statement
Arunabha Biswas

Rather than teaching math, I communicate math. And it is important in communicating math to be able to explain mathematical ideas simply and clearly, but without diluting the essence of the topic in any way. “The first principle is that you must not fool yourself - and you are the easiest person to fool”. So, while preparing for my classes, I first think about how I would explain something to a fellow postdoc sitting in my next office, then to a grad student, then to a undergrad student, then to a high school student and then to my neighbor. The goal is to reach to the bottom most level (as such as possible) to ensure that I myself understood the topic completely and ready to communicate the topic to my students. I believe that there are always several ways to explain something so that each student can understand it in their own individual way. So I always analyze the questions and mistakes of students very carefully to understand why something was not clear to them or why they were wrong; and surprisingly the reasons are subtle in many cases.

I cleverly make my lectures very funny and ridiculous, but full of content at the same time, to trick my students into finding the topic interesting.

I find it very useful to scan my students in order to have a good sense of my audience and mold my lectures accordingly (and many a time instantly) so that students get most out of it.

I put all my emotion and enthusiasm in explaining exciting math to my students, exactly the way I like math as a research mathematician, and show them how “cool” math is.

When I lecture, I do no segregate students based on their learning abilities. In my opinion, students actually like to be treated as naive equals who are bright, want to learn, have the ability to learn and enjoy math. Time can patch up the instantaneous differences of accumulation of math learning among students to a great extent.

In my experience, students enjoy organized lectures and they believe it is the most beneficial also. So I spend decent amount of time in preparing my lectures, even which joke I want to tell, and exactly when.

Occasionally, I raise questions in my class. Although these questions always have an elegant and satisfying answer, I do not tell them the answers right away. So I encourage students to start an active discussion, even for five minutes, to grapple the problem. They become vibrant, try to observe every tiny things of the problem, raise more questions, try to answer them themselves. After all, thinking happens when there is time to struggle.

I always try to inspire as many students as I can to “feel and enjoy” math like good music rather than “doing” math. I tell them with specific examples how great mathematicians think simply and make great discoveries from simple observations and basic manipulation. For example, I may describe how Gauss derived a closed form formula for the sum of first $n$ positive integers. I present critical ideas that form basic axioms of mathematics, for example, I tell Zeno’s paradox to explain countable infinity, use the Riemann sphere to explain uncountable infinity, and explain how the integral test for convergence of a series combines the notions of both countable and uncountable infinity. Since I have a background in engineering, I can easily point out real world phenomena where particular mathematical concepts are applicable.

In my life as a research mathematician, teaching is like a breath of fresh air when I am stuck in my projects; as profoundly described by one of my personal heroes - Richard Feynman: “I don’t believe I can really do without teaching. The reason is, I have to have something so that when I don’t have any ideas and I’m not getting anywhere I can say to myself, “At least I’m living; at least I’m doing something; I am making some contribution” – it’s just psychological.”
A very short teaching report for Arunabha Biswas

[Based on - Fall 2016 (two sections with 329 students) and Winter 2016 (one section with 80 students)]

1. Rating for “Overall, this instructor is an effective teacher” (out of 5).
   • Mean for this course: 4.9 (Section 1, Fall 2016), 4.7 (Section 2, Fall 2016), 4.8 (Section 1, Winter 2016)
   • Departmental mean: 3.8 (Fall 2016), 4.1 (Winter 2016)

2. Rating for “Overall, this course is an excellent course” (out of 5).
   • Mean for this course: 4.5 (Section 1, Fall 2016), 4.5 (Section 2, Fall 2016), 4.5 (Section 1, Winter 2016)
   • Departmental mean: 3.8 (Fall 2016), 4.0 (Winter 2016)

3. A few comments from students for “What did you especially like about this course?”.
   • Very well structured and organized, exactly how every math course should be taught.
   • He is an excellent professor - very good at simplifying/explaining complicated concepts. Also a very funny guy and tells interesting stories/facts.
   • Instructor’s level of clarity in explanations is among the highest in all the courses I’ve ever taken. Great job. Great use of examples. Fair evaluation in quizzes.
   • Prof Biswas is without a doubt one of my favorite profs this term. He presents the material clearly, is engaging during lectures and throws in the occasional jokes. I also really like how there are regular quizzes which makes sure that you stay on the top of knowing material.
   • I enjoyed the material presented. I think the professor is a great teacher, one of the best I’ve had in a math course so far. I also like the breakdown of the course, having a bunch of small quizzes helps me keep caught up with the course and they are of a good difficulty.
   • Prof. Biswas is a great teacher! He did a good job explaining the material and was very clear. He has a good sense of humor which creates a positive atmosphere in the classroom. I like how he made connection between what we’re learning and the real world. The homework assignments take a reasonable amount of time and adequately prepare me for the quizzes. This is my favorite course this semester.
   • The teacher was energetic and excited for teaching. The lesson method was clear. I liked that one of the quiz marks could be dropped. Overall this class was something I looked forward to. I like the practice problems.
   • Biswas was an effective teacher who was great at explaining new concepts thoroughly and clearly. The 6 quizzes were a fair way of accessing the class. Overall a great course.
   • I loved your teaching style! This is probably the best math course I have taken so far! I like that you take time to explain theorems and then go over specific examples of how to do problems. I think expectations are very clear and that makes it very helpful for quizzes.
   • The frequent quizzes gave me an opportunity to keep up with the material. The material was presented clearly. The professor is really funny and passionate about the subject (makes learning fun).
   • Teacher’s enthusiasm.
   • Arunabha Biswas is my favorite human being.

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