Teaching Statement

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During my Ph.D at Penn State, I have taught the following courses: Math 22 (College Algebra, 3 credits), Math 230 (Calculus and Vector analysis, 4 credits), Math 251 (Ordinary and Partial differential equations, 4 credits) and Math 250 (Ordinary differential equations, 3 credits). My classes are usually 4 days a week and each lecture lasts 50 minutes.

In my first year at Penn State, I attended the Teaching Seminar held on Monday every week. Since I did not have any teaching experiences at that time, I was nervous and excited at the same time. I learned a lot in the seminar, by listening to other instructors's experiences, and attended faculties' lectures. I also learned about the students through the talks given by faculty members, that students have different backgrounds, and that instructors must be kind and helpful to students's questions, but also must treat every student equally, regardless of their races, sex and identity. I also learn how to handle sensitive issues like exam cheating, students' unreasonable requests, students with disabilities, make-up exam's issues and so on. During my first year, I got a general picture of how to teach a class and how to handle typical problems.

After teaching for several semesters and working with many students, I currently have my own teaching style and philosophy. My teaching philosophy is to have a balance between rigorous proofs and examples for the students. For Math 230 and Math 251 at Penn State, over 90 percents of the students are majoring in engineering. I learn that students not only want to know why certain formulas are applied, or why a theorem is true, but also want to solve the exercises quickly and correctly to get good grades on exams. Moreover, I now use chalk board in my lecture; slides are rarely used. I only use slides to show students videos that I find useful for the topics covered. For example, there was a time I used slides in Math 251 was when I showed the students the videos of Tacoma Narrows Bridge Collapse in 1940, to illustrate the effect of resonances.

My typical 50-minute lecture is as follows: I come 10 minutes early for clarifying students' quick questions. When class begins, I spend 3-4 minutes mentioning briefly what I covered in the previous class. I repeat and summarize the main points of the last lecture, in order to refresh the students, and at the same time, enable students who came late to keep up with the new lecture. Next I explain how the present materials connect to the last lecture. After that, I state the main goals and what students need to know after the class. I then proceed with the lecture notes I prepared or lecture notes that I find the most suitable for my courses. I begin with the general theory, state the main theorems, and explain the jargons (if there are any) in the theorem. I usually pause after 2-3 minutes for students's questions. I then spend a few minutes explaining the intuition of the theorem and the key ideas of the proof when it is long and complicated, or present the whole proof

if it is short and simple. Then I explain how the theorem is used in solving problems, by doing around 3 or 4 examples step-by-step. Next, I give the students time to work out 1-2 examples on their own. I will walk around and see how the students are doing, and quietly correct or ask the students to try again if they miss the correct answer. After that, I ask the class to give me the answer, if a student answers correctly, I give compliments and ask them how they obtain the answer; if the answer is wrong, I ask for a different answer from the students. After that, I present the solutions on the board step-by-step. Finally, I ask the students if they have any questions, and whether they would like more examples or move on with a new topic. Finally, I end the class by mentioning the topic I will cover in the next class, as well as remind the students to come to my office hours if they have more questions. One of my other philosophy is that I always emphasize effectiveness over speed, and try to understand from a student perspective and background; that is why I teach slowly to make sure every step is clear. I usually write down all the identities, even if they are trivial (for example: chain rules, integration by parts, expansion of $(x+1)^3$), if I use that in my lecture. In fact, I know that most students in my class take the course Math 230 and Math 251 as a requirement to choose their major. Being aware of this fact, I always make sure that my lecture is slowly but surely for my students.

Teaching at Penn State is one of the most wonderful experiences in during my Ph.D. Since I have to teach at least two 4-credit courses in one year, I have time to learn more about students's needs over the years. I enjoy teaching a lot, as I can experiment many teaching techniques that I found interesting, and choose the one that fit most to my ability and my students. For example, there was a time I used slides for my lecture instead of the blackboard, and asked my students not to take note to pay attention to the slides and my steps. I later realized that students do not like this idea, because the speed was fast and they could not catch up all the steps, no matter how I slowly explained it. I change to blackboard again and tell them it is completely find to take pictures of my lectures, which work well both ways. Another example was when I assigned homework by group, as I expected students to know more about each other and explain things that as instructors do not see (as this is true for me from a student's perspective, I may question something very trivial to experts in their field). However, after a few weeks, some students said it was very hard to find a meeting for everyone in the group, as they have different schedules and some had part time jobs on weekends. So I gave up that idea and told the students they can discuss about the homework but need to write their homework individually.

My goal is always to try the best to deliver what I know and the materials to the young students, so that they can learn in my class. During office hours, I always answer students's questions kindly and slowly, to make sure they understand the materials. I do not usually take attendance, and I think that gives the student freedom to choose whether to go to class or learn by themselves. I design the homework and quizzes carefully to help students practice after each lecture.