TEACHING STATEMENT

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TEACHING PHILOSOPHY

I believe that teaching in general comes with a great responsability. To me, teaching is passing on knowledge, creating interest, awakening talents, and generally equipping students with tools and methods to put to use in their future career. Teaching is also passion: putting lots of effort into preparing classes to help students understand and gain access to my own subject.

In my opinion, three aspects are paramount for a good teaching experience (for both teacher and students): **motivation**, **encouragement** and **accessibility**.

Motivation. Especially in mathematical subjects, it is sometimes a great challenge for the teacher to motivate their field of study by real-life applications so that it becomes interesting for the students.

For instance, order theory can be motivated beautifully by introducing partial orders as workflows of certain everyday routines, such as making a cup of coffee. Some of the required tasks can be done in parallel (these would be incomparable), others may depend on the completion of other tasks (these would be comparable). Now, for instance, a linear extension becomes a concrete schedule for a single person to complete said routine. Even more involved concepts, such as order dimension, can be motivated in this context; this would simply be the maximal number of processing units that can work simultaneously in a given workflow. We may of course add more processing units, but they will idle most (if not all) of the time.

Real functions in two parameters, for instance, can be understood as a landscape in which we are going for a hike, where the arguments mark the current position. The value of the function is simply the current altitude, the gradient points in the "steepest" direction from the current location, and the contour line describes the path we have to take if we want to maintain the current altitude.

Besides motivating mathematical abstractions in the real world, I try to create mental images of abstract mathematical concepts in class. I strongly believe that such mental images, if well chosen, greatly aid the understanding of the concept and make it much easier for the students to recall the definition or at least the basic properties during a problem session or even an exam.

For instance, when introducing mathematical induction to first-year students, I deliberately put myself into some specific place of the room, and move towards the students while explaining, respectively, what the induction base and the induction step is.

As another example, I usually compare the chain rule from differential calculus with a set of matryoshka dolls, where each doll represents a function and opening a doll corresponds to taking the derivative of the corresponding function. At the end, when all dolls are opened and put next to each other, we can read off the correct derivative.

Encouragement. I usually try to encourage my students to work on a problem for themselves or perhaps in a small group, rather than to deliver the solution for them on a silver platter. To achieve this, I usually split my exercise sessions in two parts.

During the first part, the students are meant to work on the assignments by themselves, while I walk around, offering advice when necessary. This has the great effect that students feel safe to ask questions they would not dare to ask in front of the whole class. As another positive aspect, the students may solve the problems in their own speed, and I can give advice tailored to their needs: while some students may struggle with a basic definition, others may have deep follow-up questions.

In the second part, we solve the assignments together on the board. Sometimes single students present entire solutions in front of the class, most of the time, however, we develop the solution step-wise, where different students provide different parts. In case no one wants to suggest the next step, I try to nudge them in the right direction by asking appropriate questions.

I never get tired of emphasizing how important it is to solve exercises on their own. There will not be a teacher revealing solutions later in life (or at times more relevant: during the exams). The main purpose of this self-study is to become familiar with the approach to finding the solution rather than learning of the solution itself.

Surely, algorithms, such as the Euclidean algorithm or Gaussian elimination, can be performed well if one has simply memorized but never actually performed them, it may just take a bit longer than necessary. Taking derivatives or integrals, however, actually requires repeated practice, be it just to get used to the tricks of the trade.

My major concern, however, is to make students feel valued and comfortable in my class. I try my best to create an atmosphere, in which students feel safe to ask questions, and encourage them to do so. I will answer every question with the same patience and dedication, no matter if the students are supposed to know the answer, or if it was answered only minutes before.

I will always adapt the speed of the course to match that of the students, trying to ensure that no one is left behind. I encourage the students to reach out to me by email or in person whenever they have questions concerning the course or the assignments.

Finally, I encourage the students to give feedback and critique. It is not just them who learn during class. I make mistakes, too, and I am willing to learn and improve as well. To that end, I hand out evaluation sheets at the end of the semester with a simple "start/stop/continue"-layout, so that the students can tell me (anonymously) what they miss, what they dislike and what they like about my class.

Accessibility. I aim to make my classes accessible to everyone.

If I am responsible for the exercise sessions of a lecture held by someone else, I always prepare a short summary of the essentials which remains on the board throughout the class. This enables students to solve the exercises themselves even if they have missed the lecture. If I read a class myself, I always prepare a script containing more details and examples than what I put down on the board.

When preparing exercise sessions I always make sure to include exercises of varying degree of difficulty so that it appeals to all students. Upon request, I provide exercises beyond the scope of the class or perhaps even small research projects.

I have not yet had the opportunity to use some sort of online learning management systems, but I greatly value the paperless approach and would be very happy to contribute to such a system. Making my teaching material available online is another way to make my classes accessible for everyone.