

# TEACHING PHILOSOPHY

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Throughout my career I have had the pleasure to teach a variety of undergraduate and graduate classes in subjects encompassing both Mathematics and Physics. Every class has been a richly rewarding experience and I am as committed to my teaching as I am to my research.

As a teacher I aim at educating my students in order to provide them with a solid foundation on which to build their futures. My approach has two main components: in-class lectures and discussions, and out-of-class tailored teaching.

Over the years I have learned that it is important for the students to actively participate to the lecture and not to passively receive information. This engagement stimulates interest and allows the students to gain a deeper understanding of the subject. My lectures are never monologues but rather dialogues between the students and I, or among the students themselves. I usually spark a dialogue by asking questions and by inviting them to ask me questions. In order to keep this process alive I make sure that students feel comfortable asking and answering questions in front of their peers. I have learned that this is possible by reassuring them that no question is irrelevant and by not assigning a negative connotation to an incorrect answer. In this way I reach my goal of not being just a “communicator of facts and formulas” but rather a guide who enables them with their learning process. My aim is to stimulate active learning, to make the students appreciate the importance of asking questions, and to nurture one of the most important skills a student should have, namely the ability of critical and independent thinking.

My typical presentation proceeds along the following lines: when introducing a new concept or idea, I make sure to always explain the reasons why it is important and the process that led to it. It is fundamental for me to clearly explain how the new concept is connected to the ones already covered. I believe that in this way the students do not perceive the subject as a collection of separated ideas but as a process of building knowledge in which every idea is critical to the development of the next one. After formally describing the topic, I present several illustrations to help my students understand how that idea can be applied in a variety of different contexts. I believe that showing applications is important for two reasons. The first lies in the fact that the students can explicitly see how to correctly apply the concept and the formalism in different situations. The second focuses on the fact that “not all students want to be mathematicians” and therefore it is highly beneficial to show how the mathematical concept they just learned has meaningful applications to the specific discipline they are most interested in. At the end of each class, I summarize the most important topics covered and give my students a sneak preview of the material to be examined in the next class.

Obviously my role as a teacher is not only confined to the four walls of the classroom. I am committed to being available to students outside the class. Beyond regular office hours, I always encourage my students to make appointments to meet with me. This one-to-one time spent with students serves at least two important purposes. First, the questions that are asked offer me valuable feedback on what the students are actually learning in class and what topics are not yet clearly understood. In this way I can adjust my classroom presentations in order to respond to the needs of the students. Second, since the student population is large and diverse, learning skills and preferences will be different

from one student to the other. The time invested in a one-to-one discussion with students allows me to teach them in ways that are particularly tailored to their needs. Beyond my regular office hours, I often hold optional evening Q&A sessions. These are wonderful opportunities for me to assess the progress my students are making. During these sessions the students ask about homework questions that they have found difficult as well as work on relevant challenges that I prepare for these extra sessions. In this setting I do not explicitly answer the questions for them but I guide them towards the solutions because, as we all know, “you cannot learn mathematics by just watching someone else do it.” Once the students have finished their challenges, I usually ask them to present their solution to the group as I believe that it is important for them to learn how to communicate their ideas in a clear and organized fashion. I have heard from my students that these Q&A sessions were very beneficial, as well as a lively and informal opportunity for all of us to engage in the material outside of class. I am therefore committed on continuing to offer this service to my students.

One of my greatest priorities is to introduce current ideas of mathematical research in the classroom. My approach for exposing students to my own research is to utilize topics that we are discussing in class and are directly related to my scholarly interests. For example, when talking about the cone I seize the opportunity to explain what a generalized cone is and briefly outline, in simple terms, my research involving the generalized cone. These remarks spark interest and often students stay after class to ask me questions about my current work. It is my goal to recruit students to engage, under my guidance, in scholarly work. In order to prepare students for research I am committed to offer classes in special topics that would enable them to gain the necessary background knowledge. The techniques that I use in my research are rooted in complex analysis, differential equations and asymptotic analysis, such classes would provide the interested students with the necessary tools to participate in my current work.

My teaching methodology has produced good results over the years. Several students enrolled in my classes purposely take other classes that I offer and many students often tell me that they would certainly enroll in classes taught by me if they had the possibility. I consistently receive extremely good comments from my students about the extra sessions that I offer as they find them very useful and effective. After my course ends several of my students continue to stay in touch with me, share with me their academic progress, and often come to my office to ask questions related to other mathematics courses they are taking.

I want my students to look at a question from different perspectives, and leave my class with the desire to come back and learn more. I believe that teaching is actually a learning experience for me as well as for my students, and I will always keep my mind open to ideas and methods that would improve my effectiveness as a teacher, whether they be comments from my students or suggestions from colleagues.