

# Teaching Statement

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Teaching Mathematics requires care and dedication. My primary approach to teaching is to create a motivating environment for the students: show enthusiasm when teaching, instill interest in the topics, engage students in class discussions and make them feel safe to ask questions.

I often use the method of think-alouds, while explaining new theories or solving new problems, and I invite the students to give their opinions and formulate a logical concatenation of evidences that will lead to the right answer. I constantly stress out that there are no wrong answers; some of them might only need some extra guidance.

The goal is to help students to develop a mathematical intuition and analytical skills that can be successfully used in areas within Mathematics and beyond that. Sometimes I challenge the students by suggesting them a set of tools, that have been explained earlier, and inviting them to think about how to use them in order to solve a new problem. I wholeheartedly empathize with the students' struggles and success to understand new concepts.

As a general guideline, I structure a (theory) class into three or four parts: a quick review, a theory explanation, a set of examples and possibly a conclusive remark. The order of these parts is not strict and it is constantly adjusted and tailored to the specific class, the material to teach and the ensemble of students.

At the beginning of every class, I dedicate the first minutes to recall previously learned material, so that the students have a basic background to start the class with. This is also an effective way to gather their attention before tackling the new material. During these daily re-loopings I always engage with the class, in order to spot some eventual weaknesses or confusion that need to be addressed before proceeding with a new topic.

When explaining a new rule or a new formula, I refer to the textbook with clarity, but I explain the passages and the arguments in more details, so that the time spend in class is for the students a valuable time, worth investing in. On the other hand, I regularly remind the students that textbooks are extremely valuable in the review process that they should undergo after class.

During the lecture, I pay careful attention to adjust my speech to the students' receptiveness and ask for feedback on their understanding: I often repeat important information, paraphrasing it, stressing the key ideas and using simple words. Only in a second moment, I write the concepts on the board, using specific and more formal words. This will help them to develop a solid Mathematical vocabulary which they will be able to use in writing homeworks in a clear and structured way, and it will be beneficial in strengthening their (technical) communication skills.

After illustrating the theory, I implement it with some exercises. My goal is to solve at least two exercises, with the active participation of the students: an easy and straightforward application and a more challenging one. In doing so, students will be able to explore all the possible ways to solve the problem using recently explained tools; they will analyze the exercise and they will compare the hard problem with the previous easy one, to find some common patterns and get an

intuition on the method to follow. I rarely borrow the examples from the textbook and I propose genuinely different and explanatory exercises.

Depending on the topic, sometimes it is more convenient to start the lecture with an example and then guide the students, with a series of questions and answers, to the right solution. After the first example, the general theory is then exposed and more examples follow.

Whenever possible, I also link the topics covered in class to real word applications and show the possible developments of theorems and techniques. In particular, I am keen on complementing the textbook with additional material like personally typed lecture notes, explicative videos or stimulating web links. More recently I became interested in the use of interactive notes with Jupiter Notebook where the theoretical part of a course is integrated with its applicative part (numerical simulation, modeling, data visualization, coding, etc.).

Finally, when a considerable portion of the program has been covered, I take a brief moment to reflect with the students upon what has been seen so far and where the class is heading to, so that the learned structures are constantly reinforced.

I consider my teaching job to not be over at the end of every class, but to continue outside the classroom. I encourage my students to come to me to expose their doubts and ask for clarifications during office hours, at the end of classes or through email exchanges.

I make an extensive use of digital resources: the online class management system (Moodle for Concordia, Canvas for CSU, Léa for John Abbott) is the main reference for sharing notes, webpages links and old versions of midterm and final exams, when available.

The homeworks are either directly solved online (using WeBWorK, for example) or evaluated using grading softwares (Gradescope, in particular, is equipped with interesting and valuable AI features). Additionally, I set up an online student forum and discussion group for the students (on Canvas/Léa or using the Discord online app), where they can discuss about the theoretical part of the class or about their homework. I also participate into the threads by giving hints or help, when appropriate.

When a test date is approaching, I usually set up a few hours of exercise sessions outside the class schedule to meet with the students, clarify their doubts and solve problems together, to better prepare them for the exam.

On a regular basis, exercise sets on recent topics are handled to the students. The format of the exercise session is a flipped class, so that active learning can be directly implemented. It is a useful tool for both the students and myself to understand to which level the concepts are understood. On the other hand, assignments are intentionally created to be more challenging in order to boost students' intuition and discussions among themselves. While grading homeworks and exams, I give constructive feedback and post a detailed description of the solutions.

I strive to give to the students every possible facility to deeply acquire methods and theories, so that they can succeed in the course and become fully independent and confident in facing future related problems that they may encounter.