Teaching Statement

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The following pages summarize my teaching philosophy, which combines my experiences as a student, a teaching assistant, an instructor, and a faculty member. I have undergraduate degrees in business and engineering, and throughout obtaining them, I learned what a good teacher does and does not do. In a general sense, when you stand in front of a class, you have two obligations: 1) present the class according to your up-to-date knowledge and 2) guide and mentor your students as they learn. Because the teaching philosophy of a faculty member can influence students in many positive ways, even changing the course of their lives forever, I know that a faculty member can make a lasting difference in a student's life.

Teaching experience

As a business school undergraduate student, I taught accounting (I to IV) and costing (I-II) courses. Courses were extensive (around 50 students), and this was my first experience managing large groups. Upon graduation, I became an instructor in the accounting department, and the university gave me several workshops on several topics such as grading, preparing exams, and using teaching platforms. Still, I had to learn how to deal with happy and unhappy students (especially after exams) and present my teaching in a more engaging, even entertaining, way. Studying Industrial Engineering, I could see the difference in teaching styles between a business and an engineering school. In my view, engineering students had more practical experience because the faculty had more hands-on industry experience gained through consulting projects. Since then, I have sought this flexibility in my teaching, so my courses always consider an applied problem to solve during the semester. I take every opportunity to either do consulting or talk with company executives to learn what problems they have and how they handle them. To form industry leaders, you, as a faculty member, must be able to solve industry problems.

On a Fulbright scholarship, I came to the US to pursue a Ph.D. in Industrial Engineering at NC State University. Even though I was never a teaching assistant, my advisor taught me his teaching philosophy and showed me how to interact with graduate students. Once, he said, "Graduate students are not just someone you give a problem to solve. They are someone you help to learn how to solve problems in a way nobody had thought before, so that way they can be completely independent after graduation"—his words finally sunk into my mind when I became a faculty member. For the last five years, I have been an Assistant Professor at the Department of Industrial Engineering at the University of Concepcion, Chile. At the Undergraduate level, I have taught Simulation (Fall terms 2016 to 2021), Machine Learning for Business Intelligence (Spring terms 2017 to 2021), and Introduction to Machine Learning (Fall terms 2019 and 2020). At the Graduate level, I have taught Operations Management (Spring terms 2017 to 2021), Logistic Engineering (Fall terms 2016 to 2019), Machine Learning (Summer terms 2018 and 2019), Simulation (Fall terms 2016 to 2020), and half a course of Stochastic Models (Spring terms 2017 to 2020). During this time, I supervised six graduate students and more than 20 honor thesis students, helping them learn how to solve large-scale unstructured simulation-optimization problems. I sincerely believe it is my responsibility to mentor the next generation of researchers and professional engineers.

Teaching philosophy

Based on what I previously described, the pillars that support my teaching are the following: 1. **Respect:** This is one of the fundamental building blocks of teaching. You must respect your students and vice versa. Showing respect means: preparing good classes, being on time, giving them the chance to learn from their mistakes, respecting your office hours, and providing a safe environment for them to experiment with. Encour-

aging respectful interactions among students during class prepares them for being better citizens once they leave the university, which is the ultimate goal of education. 2. **Mentoring:** This item has been so paramount in my formation that it influences everything I do as a faculty member. I firmly believe that mentoring starts in the classroom when the teacher connects with the student, transferring part of his philosophy, boosting his passion for learning while sharing his curiosity about a topic that, possibly, they have never seen before. Mentoring helps students to get personal advice from a faculty member that, in the end, could help them define their future. 3. **Dynamism and Innovation:** Dynamism and innovation in the classroom are essential. I learned this as a student, and I apply it when I teach now. The voice tone, the use of the classroom space (the instructor must fill it), and the innovation of teaching methods such as "flipped classroom teaching", "learning by teaching," etc., help to present the contents in a more amicable way to the students, fostering engagement and interaction. Finally, content customization is a part of innovation in the learning process. 4. **Passion:** Teaching is a continuous learning process. The actual learning process starts when the topic inspires you to the extent that you want to keep learning more and more about it. Incredibly, as a teacher, I relearn about both myself and the topic while teaching. Since this is a never-ending process, you must be passionate about exploring new topics, updating knowledge, and transferring it to your students. 5. **Inclusiveness:** Students from every walk of life enroll in a course; thus, you must foster an inclusive teaching and research environment. In this sense, I am interested in working with any student regardless of their gender, ethnicity, religion, sexual orientation, or country of origin.

Teaching Interest

I am primarily interested in teaching Simulation and Machine Learning topics at the undergraduate and graduate levels. I have the experience of covering the material on a semester-long basis. As I previously mentioned, I am always interested in connecting academia and industry; thus, I would like to teach applied courses to solve large-scale industrial problems in the following topics.

1. **Machine Learning:** I can teach either the Introduction to Machine Learning or the Machine Learning for Business Intelligence course at the undergraduate level. Here, the focus is on understanding the concepts and basic models of supervised and unsupervised learning. I can offer an Applied Deep Learning course covering more advanced topics such as deep learning, convolutional neural networks, recurrent neural networks, reinforcement learning, and Generative Models for graduate students. I can also teach the algorithmic implementations in either TensorFlow or Pytorch.

2. **Simulation:** I can teach Simulation Modeling for undergraduates and Simulation Analysis for Master's or first-year Ph.D. students. However, I am interested in offering a Multiparadigm Simulation course for masters and Ph.D. students. The idea is to teach how to implement Discrete Events, Systems Dynamics, and Agent-based models from scratch using Python. I have already implemented each paradigm with different students at the University of Concepción, but I want to formalize it as a semester-long course. Moreover, Python allows for rapid prototyping and opens the door to integrating each paradigm with either machine learning algorithms, optimization procedures, or both to test research ideas. This course would require previous knowledge in programming and simulation analysis. In most cases, you do not need a big simulation model but carefully tailored ones that are difficult to build with proprietary software.

3. **Geographic Information Systems (GIS):** I have noticed that GIS is essential in many Industrial Engineering applications. For example, facility location and/or emergency response models fit naturally with GIS software, so I used QGIS for research and teaching. I am interested in offering short courses or seminars for undergraduate and graduate students interested in the subject.