Zeynep Ertem

Teaching Statement

My passion for teaching over the last two decades has enabled me to touch the lives of students from diverse backgrounds, interests, and goals through the classes I have taught and assisted. I see teaching as a privilege to help **equip a diverse student body with the skills and knowledge to become productive members of society**, especially at a time where the working world is more changeable and unpredictable than ever, according to World Economic Forum[1]. I also see teaching as a collaborative activity with other faculty and teaching staff in the department to **fulfill and advance the teaching mission of the department.** Finally, I see teaching as an instrument to **attract and inspire under-represented groups such as women to technical fields such as ours.**

Lecturing & Teaching

My teaching experience during my undergraduate and graduate education includes designing and teaching a class on my own, giving guest lectures as well as assisting in a broad set of graduate and undergraduate classes such as engineering economy, production planning and supply chain, linear programming, operations research, scheduling, integer programming, management for engineers, and introduction to industrial engineering.

I have successfully **designed and taught a semester-long class on the engineering economics** to over 60 students. I was responsible for all aspects of this class from preparing the curriculum, the class material, quizzes, exams, office hours, assignments, and grading. This rewarding experience enabled me to interact with students at different levels, with different backgrounds, and different interests, which helped me to develop my own view of teaching.

Teaching philosophy

My teaching philosophy is **individualized and student-centric.** Each student in the classroom is unique (e.g., a unique background, interests, and goals) with a unique objective to achieve at the end of the class. As an instructor, my main objective is to facilitate my students to discover their individual objectives while covering the class material. More importantly, I aim to connect their knowledge and passion with the class material to inspire them to become the capable engineers of the next generation. Practically, I plan to introduce healthy-levels of freedom in choosing class projects to let students express their individual interests.

Another key aspect of my teaching philosophy is the **focus on collaboration and teamwork.** I expect almost all of my students to work in a team in at least in some part of their professional career, if not most. I want to prepare them for such a future via their experiences in my class. Specifically, I want to encourage peer-to-peer learning of the course material as a method of teaching coupled with real-time analytics and feedback. For example, I plan to utilize technological teaching tools such as Learning Catalytics[2], a digital engagement system that works with any device students might have, and NB[3], a digital text annotation tool for collaborative reading, to improve student engagement through peer-to-peer interaction. The first tool provides real-time feedback to students in class using their own devices and immediately can assign students to groups to further discuss a question or a subject matter with other students improving peer-to-peer learning. The second tool creates a digital

[1] https://www.weforum.org/agenda/2017/07/skill-reskill-prepare-for-future-of-work/

[2] https://www.pearson.com/us/higher-education/products-services-teaching/learning-engagement-tools/learning-catalytics.html

[3] http://people.csail.mit.edu/sacha/nb/

collaborative experience for the class reading material in which students, instructors, and teaching assistants can collectively highlight, discuss, clarify any points or issues about the reading assignment while everyone has the freedom to read the material whenever they choose to read. I believe these types of technologies will encourage and inspire students to collectively work as a team while learning the class material. Also, I believe that focus on teamwork during the class will prepare them to the changing and unpredictable workforce.

Finally, I aim to make **the classroom experience close to the real world work experience.** To achieve this goal, I plan to encourage my students to choose their class projects from real-world problems by using websites such as Kaggle[4], where many organizations post real-world industry problems and the relevant data in the forms of competitions. I also plan to take advantage of my personal network both in academia and industry to have guest lectures to discuss research and practical issues around the subject matter.

Advising and diverse community building

I also enjoy mentoring and advising students. I have **mentored three students** throughout their graduate programs and our work resulted in two working papers lead by these students. Each experience has been unique and rewarding for me as I learned the different ways to bring the best out of my students. I encourage the strengths of a student to shine while helping them develop their skills in all areas. I also encourage them to collaborate with their colleagues, especially with complementary skills and knowledge to amplify the impact of their projects.

As a woman in engineering, diversity is a topic close to my heart. I plan to not only **serve as a role model** but also **design my classes so that they are engaging to students from diverse backgrounds.** For example, a popular New York Times article[5] promoted the idea of reframing the goals of engineering curriculum to be more relevant to societal needs to attract more women. I plan to leverage my research on healthcare system optimization to offer classes with societal impact.

Example classes

With my growing experience in teaching and student-centric teaching philosophy, I would be happy to teach undergraduate and graduate classes in **theoretical and applied aspects of operations research as well as supply chain, information management, discrete optimization.** I am also excited to introduce new courses that can help to fulfill and advance the teaching mission of the department as explained below.

Health-care system optimization. This project-based class will familiarize advanced undergraduate students with basics of interdisciplinary projects. Specifically, we would employ basic methods of operations research, linear programming, and simulation, to address challenging real problems in the context of healthcare systems. I also plan to discuss the priorities and goals of different stakeholders in interdisciplinary projects to prepare students to work with professionals from other fields.

Machine learning methods for operations research. Machine learning has become a popular field to deal with uncertainty. As operational problems deal with uncertainty such as dynamically changing traffic patterns for the vehicle routing problem, our field can benefit from statistical models that can provide predictions under uncertainty. The aim of this course is to introduce basic machine learning concepts such as classification and regression in the context of operational problems such as forecasting and inventory management.

I see teaching and advising as integral parts of my academic career and looking forward to helping fulfilling and advancing the teaching mission of the department.

[4] https://www.kaggle.com

[5] https://www.nytimes.com/2015/04/27/opinion/how-to-attract-female-engineers.html