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Teaching Philosophy

My teaching philosophy is based on three specific beliefs acquired from teaching undergraduate and senior mechanical/aerospace engineering courses (Statics, HOLSIP and Design & Synthesis Exercise) at the Faculty of Aerospace Engineering at the Technical University of Delft (TUD) where I currently work as an Assistant Professor. In addition, I am an Adjunct Professor in the Department of Mechanical and Aerospace Engineering at Carleton University in Ottawa, Canada where I am still an active member of the faculty and have taught various undergraduate and graduate courses. At Carleton University I had the opportunity to teach Feedback and Control Systems and CAD/CAM during various academic years. In addition, I have taught the CAD/CAM course for technical students, at Algonquin College, also located in Ottawa, Canada. Based on my academic background I feel very comfortable with teaching all undergraduate courses in the field of Materials, Computer Integrated Manufacturing, Computer Aided Design, and Solids and Structures in both Mechanical and Aerospace Engineering. At the graduate level, I am prepared to teach linear and non-linear FEA, Structural Health Monitoring and Smart Structures.

My first belief is that as teachers of engineering, we are providing a social service for the development of critical thinkers and problem solvers for the 21st century. In the early engineering lectures we initiate the educational process by communicating the basic principles of engineering. However, if that was all that we as teachers of engineering did, we would fail in the fundamental task of forming the students for the tasks that they will face in the future. It is important that we teach our students to look at problems by questioning the established paradigms and thus to learn to develop multi-physics solutions to the complex problems we face today. My second belief is that due to the complex and globalized world we live in, it is important that our students have a broad understanding of the cultural diversity and are capable of working with their peers and in teams. As parts of this second fundamental belief, I am sure that the respect for cultural differences will help the students to become well-accepted and respected engineers in the globalized world. My third pedagogical belief involves the formation of the ethical and humanitarian qualities of the individual as a whole. As engineers we are bound by a well-defined code of ethics and professional law. It is important that we as engineering teachers help in the development of the humane aspects of the individuals that have chosen to be part of our profession. This development is taught explicitly and implicitly, by leading by example and by encouraging students to take courses in the humanities, arts, languages and, in particular, in philosophy.

We live in a complex world and as such it is important that we are constantly learning and adapting. As an engineering professor, it is fundamental that I aid in the development of engineers for the 21st century that requires individuals who are critical thinkers, who are adaptable and, most importantly, who can learn to learn. Learning different engineering concepts is just one of the challenges that today's students face. However, it is absolutely crucial that they learn to continue to educate themselves and work with their peers for the solutions of the many challenges that they will face throughout their careers. It is also extremely important for me as a teacher to serve as a guide for each student so that he or she becomes self aware of his/her strengths and weaknesses. As a teacher my duty is to teach students to learn independently so that they become adaptable critical thinkers.

Classrooms in Canada and to a certain extent in the Netherlands reflect the multicultural composition of its population bringing together students from different ethnic backgrounds. From m teaching experience I learned that independent of the socio-economic and ethnic backgrounds, we all face challenges in learning technical concepts. Classroom diversity requires the teacher to be able to communicate even the most challenging technical subjects in simple terms. Prof.

Feynman's Lecturers on Physics are a classical example of how a good, clear communication is an effective means of explaining even the most challenging concepts. Thus, being able to communicate clearly is a necessary requirement for an effective teacher. Communication combined, whenever possible, with practical experience is a fundamental aspect of my teaching philosophy.

As a teacher I attempt to put myself in the students' position, and whenever time permits, I start from the basic concepts assuming that the students may not have the necessary background to understand the subject matter, especially if I am teaching courses in the first and second year of an engineering program. When starting a class, I always spend the first few minutes interacting with the students by asking them questions on the previous lecture. My aim is not to intimidate the students but to understand how well the fundamental concepts have been learnt and thus to ensure that the important concepts have been well understood. If unsuccessful in achieving this objective, I then attempt to re-emphasize an unclear concept by providing a different example or explanation. During this initial question period I try to ask the class if the answer provided by one of their peers is correct or if it requires clarification. If the matter requires further clarification, I attempt to ask another student to explain the concept in his or her own words, always making sure that we arrive at the correct explanation collectively. This interaction with the students is often well liked by many in the classroom and sometimes strongly disliked by others. In my evaluations, some students respond that they feel that the questions at the beginning of the class provide an opportunity for clarification of the previously taught concepts and, as stated by some of them, "it keeps us on our toes". However, this type of questioning is not always well received by everyone, since some students feel intimidated by the professor. It is important for me to be seen as an approachable and accessible teacher. This accessibility is achieved by having an easygoing personality while maintaining strict rules and guidelines in the classroom. This accessibility, is also emphasized by having the necessary office hours and providing the students with enough one-on-one interaction before or after the lecture.

Teaching requires intellectual honesty and ethics. I remember that no matter how well I prepared for my first lecturers I would have one or two students who were capable of asking questions to which I would not know the answer. My response to this type of situation was not to be afraid to say, "I don't know;" however it was important that the question be answered and thus, I would take the time to look up the answers and be prepared to provide an answer at the following lecturer.

In today's computerized university, it is common to have classes that are taught purely from PowerPoint presentations. It has been my experience that a lecture that is taught primarily from slides or from looking at a projection system is not always well perceived by the class. Thus, I prefer to have a balance of slides and examples that are developed on the board. Whenever possible, I combine the use of examples with educational videos and interactive learning tools. For example, when teaching Feedback and Control systems, the use of MatLab in explaining the effects of each variable in a Proportional Integral, Derivative (PID) controller provides an effective approach in emphasizing the concepts under study. This approach gives one a great opportunity to focus the students' attention on the practical aspects of the course. Some of the courses that I have taught combine lectures with labs or problem solving sessions. These laboratory and classroom experiences provide the students with an important opportunity to put into practice what has been taught in the lecturers.

In summary, I believe that a good teacher is the one who has intellectual honesty, an individual who is approachable, aware and sensitive to cultural diversity, passionate and able to communicate and put into practice the subject matter of the course with the goal of the formation of engineering critical thinkers and problem solvers for the 21st century.