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LANGUAGES

English: (Native/Bilingual)

Spanish: (Native/Bilingual)

French: (Limited working)

TEACHING PHILOSOPHY

My teaching philosophy is based on three specific beliefs acquired from teaching undergraduate and graduate mechanical and aerospace engineering courses (Stability and Control of Aeronautical Vehicles-AE430, Introduction to Aeronautical Engineering-AE212, Feedback and Control Systems, CAD/CAM, Statics, HolSIP-ME530, and capstone projects, AE/457/557 Aerospace Composite Design) in the Department of Mechanical and Aerospace Engineering at Clarkson University were I currently serve at the rank of Professor. In addition, my previous position at the Faculty of Aerospace Engineering at the Technical University of Delft (TUD) in The Netherlands, allowed me the opportunity to teach undergraduate courses in mechanics and design. In 2016-2017, I was recognized with the Excellence in Teaching Award by Clarkson University Student Association. Based on my academic background I feel very comfortable with teaching all undergraduate courses in the field of Materials, Structures, Computer Integrated Manufacturing, Computer Aided Design, Aerospace Structures, Solid Mechanics, for both mechanical and aerospace engineering. At the graduate level, I am prepared to teach linear and non-linear Finite Element Analysis, Fundamental of Acoustic Ultrasonics, Fundamental of Fatigue and Fracture Mechanics, Aerospace Composite Design, and Smart Structures.

My first belief is that as teachers of the engineering discipline, 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 we did a as teachers of engineering, 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 cultural diversity and can work with their peers and in teams. As part 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 a globalized society. My third pedagogical belief involves the formation of the ethical and humanitarian qualities of the individual. 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 humanitarian 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, and, particularly, in languages. 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 who are critical thinkers, who are adaptable and, most importantly, who can teach themselves to learn. Learning different engineering concepts is just one of the challenges that today's students face. However, it is 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 they become self-aware of their strengths and weaknesses. As a teacher, my duty is to teach students to learn independently so that they become adaptable critical thinkers.

Classrooms in the United States of America reflect the multicultural composition of its population, bringing together students from different ethnic backgrounds. From my 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 classic example of how 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, 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 easy-going 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 and/or after the lecture.

Teaching requires intellectual honesty and ethics. I remember that no matter how well I prepared for my first lectures I would have one or two students who could ask 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 lecture.

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 received 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 lectures.

My future goals as a teacher, include the integration of practical design tools in research and problem-solving scenarios. As such, I envision a design, research and development lab serving as an integration hub for experiential learning. A new product design challenge would be presented to the incoming class every 4 years. However, the vision is not to be intended as a capstone project, but to allow every aspect of the courses being taught in materials, structures, fluids, controls, sustainability, and manufacturing just to name a few, to be integrated in a practical experiential learning at all levels of the engineering curriculum. For example, an initial project that is close to my heart is the design of amphibious Unmanned Aerial Vehicles (UAV). This multi-disciplinary design challenge would allow Professors in the different disciplines to setup practical labs associated with their individual courses. Thus, professors in fluids could teach the basic principles of aerodynamics utilizing and selecting the best possible airfoils for the mission requirements. Professors in materials, would evaluate the need for durable and sustainable materials for maritime applications. Professors in structure would use the project for the analysis of structural components, i.e. wings, longerons, fuselage, etc. This experiential learning approach would transition from very simple concepts such as strain and stress in fundamental engineering courses to very complex engineering concepts and technical applications in finite element non-linear analysis and computational fluid dynamics, just to name a few.

This experiential learning experience also provides a unique opportunity for innovation. What a better way to teach students about certification processes in different fields than by building a product that is functional and is required to pass certifications standards. This opportunity also lends itself for the implementation of virtual reality systems that would integrate graduate courses in the field of machine learning, non-destructive inspection, and the application of artificial intelligence. The use of virtual reality headsets would allow students and faculty to visualize the designs from a variety of angles, or the implementation of artificial intelligence for damage detection and their impact on the products performance, functionality, and life.

In summary, I believe that a good teacher is one who has intellectual honesty, an individual who is approachable, aware, and sensitive to diversity of the classroom, passionate, innovative, 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.