Statement of Teaching Philosophy – Fadel M. Megahed

“The whole art of teaching is only the art of awakening the natural curiosity of young minds for the purpose of satisfying it afterwards” Anatole France (1884-1924)

This quotation embodies an important aspect of what teaching should be. I have always believed that my best teachers were not necessarily the most knowledgeable, but were the ones who took each class as a challenge to deliver a concept, develop engineering common-sense, and a holistic view of what the course is about. The information that we teach is found in books and therefore, I am more interested in the more challenging problem, which is how to relate the seemingly complex engineering concepts to the students in a way in which they will be able to understand them. I want them to have a lot of “aha” moments. In one of the problem sessions I gave as a Teaching Assistant, I was asked by a student to explain the Negative Binomial Distribution; he wanted an equation, I replied by a question asking him if he watches baseball. After the student said that he was “a big fan of the game”, I explained to him both the geometric (a special case of the negative binomial) and the negative binomial distributions in terms of baseball. He was delighted and he told me that with this explanation he will never forget both the distribution and the explanation.

The previous example also reflects an important aspect of my teaching philosophy, which is to tailor teaching to individual student differences. I believe that there are generally three types of students: some learn best on their own using a textbook, some learn best through working out examples and some have to learn analogies to tie down the material. I believe that how I lecture should allow all three types of students to learn, but how I answer in-class questions (or questions in my office hour) should take into account a student’s background. Therefore, I will ask the student to read in advance about what I am planning to teach for the lecture, I will let them ask questions about what they read and I will provide analogies to tie down what they have learned. I understand that some students will not necessarily comprehend everything they read out of a textbook; however, this will not be a problem since I will use each class to explain one key concept and therefore, I will make sure that this concept is clear and well understood by each of the three student groups. As a self-assessment tool I usually ask them, in each homework assignment, to anonymously submit their ideas for how the course material can be improved.

My role as a teacher is to explain more than just these concepts; it is to explain how each of these topic helps in connecting the jigsaw puzzle that I am trying to convey by the end of the semester. Therefore, I routinely refer and point to how the current topics relate to the “big picture” and how the “big picture” is making them more sound engineers. If the course being taught is an undergraduate course, then I also emphasize how these fundamental concepts are related to other concepts that the students have already studied. This is extremely important since I believe that a major part of undergraduate education is to develop a set of tools, where future engineers can utilize in the enhancement of human welfare and the prestige of our profession as
highlighted in several engineering societies’ codes of ethics. On the other hand, if it were a graduate course I would focus more on the process of generating new knowledge through the scientific methods. In the process, I would utilize examples from my research, as well as the research of my students and colleagues, to ensure that the students become exposed to different research strategies so that they can find a strategy that would work for them. This would enable the graduate students to become researchers and confident of their ability to tackle problems and generate knowledge that would be of benefit to the scientific community and/or industry.

In order to measure the success of my students, and my own success as an instructor, I use a variety of assessment methods. I believe that a combination of homework assignments, periodic tests and a project would provide a good assessment of the students’ understanding. Homework assignments provide the students the opportunity to gage their understanding of the theoretical concepts and their ability to utilize these concepts in solving problems. In addition, it provides them the opportunity to learn using software (such as: MATLAB™, or Minitab™) to solve these problems, which is an important recruiting benefit in today’s ever-demanding job market. On the other hand, each quiz/test presents an opportunity for students to demonstrate what they have learned from the feedback on the assignments. The project would allow students to synthesize what they have learned and work on something practical that not only appeals to them, but can also potentially help them apply it to a real-life problem. Using all these methods, in addition to the self-assessment tool at the end of each class, would provide me with an overall representation of the students’ understanding and consequently, I could evaluate the effectiveness of my teaching methodologies for that particular group of students. If only a small group of students do poorly, then these students need more assistance and I would provide them with more individualized help during my office hours. Conversely, if a larger group fails to master the material, I would change the level at which the course is taught and how I deliver the material.

As an engineer who has been brought up in a developing country, I take pride of being a role model to underrepresented students showing them that through hard work and dedication their dreams can come true. I also aim at informing all students at the possibilities of graduate school and the possible career tracks based on graduate school. As a mentor to undergraduate students, I have introduced a number of students to research and to the beauty of tackling open-ended research problems. I believe that this discussion can be an important factor in a student’s decision for a future career and I would strive to provide my students with all the help they need to pursue a career where they can accomplish greatness.

I look forward to teach industrial engineering courses throughout my career. I will continue to challenge myself by continuously adapting more effective teaching styles and continuously evolving the course content to match the ever-evolving needs of students, industry and academia. In the meanwhile, I will continue to promote high level of expectations for my students, both in the classroom and afterwards in their professional career.