

Teaching Statement

Teaching Overview and Objectives

Pedagogy is essential to the sharing of knowledge and is thus vital to the success of any industry, innovation, or civilization. Upon graduation with a Ph.D. degree in Electrical Engineering I'm interested in not only contributing to the technological innovations of society but also preparing and inspiring others to contribute through scholarly pedagogy. Specifically, I'm interested in teaching introductory undergraduate level courses in either Physics, Material Science, and/or Electric Circuits and graduate level courses in Electrochemistry and/or Electronic Materials. Course objectives would vary for the specific subject matter but all would include improving the student's proficiency at problem solving, mastering of the fundamentals, and gaining laboratory experience (if possible). For example, upon completion of my Electric Circuits course, students should be able to successfully implement the laws of Ohm, Kirchoff, Thevenin, Norton, etc., during problem solving. In addition, students must be able construct circuits on a bread board, and be competent in the use of an oscilloscope, amplifier, function generator, and data acquisition software such as LabView. Overall, I believe an effective instructor must (a) enjoy or have a passion for teaching, (b) understand the roles of the teacher and of the student, and (c) be able to implement methods that facilitate the learning process. The following paragraphs will discuss these aspects in further detail.

Passion for Teaching

An instructor whom is passionate and enthusiastic will be more likely to engage student interest and facilitate learning. I enjoy teaching and this will reflect upon my students in a positive way. One reason for my joy of teaching is that I feel a sense of accomplishment when I can help others learn challenging material. I feel that I am equipping them to become better scientist or engineers whom will use their newly found talents to achieve important tasks or goals within industry, benefit mankind through scholarly research or innovation, and/or help others to learn by becoming teachers themselves. Ultimately, I desire to help them be successful and I want all my students to succeed.

Teaching and Mentoring Experience

My passion for teaching is reflected in my previous teaching/mentoring experiences. Although, my experience has generally been at the K-12 level, it has established a strong foundation for teaching at the college level. This is because I have developed a skill for digesting challenging technical information and communicating what I have learned to a less technical audience in terms that they can understand. This allows me to fulfill one of my goals as an instructor, to make learning as simple as possible. In addition, I plan to gain some additional teaching experience at the college level before graduation.

During my undergraduate education at North Carolina State University (NCSU), I volunteered as a START mentor, in which I assisted incoming minority freshman engineering students academically (through tutoring) and socially in order to help them adjust to the hectic college atmosphere. In addition, I took on the position of Pre-college Initiative Chair on the NCSU Chapter Executive Board of the National Society of Black

Engineers (NSBE). In this role, I became the main individual responsible for establishing three high school NSBE chapters, thus helping more than 40 high school students participate in technical workshops, receive tutoring from college students (including myself), and participate in campus tours of NC State. For my first year of graduate school at Duke University, I was selected as a National Science Foundation supported teaching fellow for a special program, Math Understanding through Science and Integrated Curriculum (MUSIC). I made a decision to accept this opportunity, despite the fact that it would lengthen my time of study and research before graduation. In this program, I spent at least ten hours every week teaching my own lessons and activities in 6th and 7th grade classrooms. The goal of the program was to help the students, whom had diverse ethnicities and backgrounds, gain an interest in math, science, and engineering. During my third year in graduate school, I participated in another youth educational program, Boosting Opportunities and Overtures in Science and Technology (BOOST). This program allowed me to become a “science coach” and mentor for two under-represented and and/or economically disadvantaged 6th graders in the Durham area. My main role was to help the students to learn the scientific process and apply that process by participating in the North Carolina Science Fair. Ultimately, I helped the students decide on a project, purchase the materials, perform the experiments at Duke, and prepare a poster (and power point presentation although not required) for the science fair. One of these students won third place in their category at the NC Central Regional Science Fair, amongst competing students from 12 NC counties, just one ranking away from competing at the state level.

Teacher/Student Roles: Process of Teaching and Learning

I believe students learn most effectively by applying information received in the classroom through problem solving, laboratory exercise, or other student-centered activities. Student-centered learning is beneficial since it promotes active learning which is usually more effective than passive learning. However, too much student-centered or student-controlled learning is not effective. If students could already learn everything on their own, what is the purpose of having an instructor at all? Thus, there needs to be a balance between the teacher lecturing/presenting and student application or practice. It is the teacher’s role to present content, direct students to other sources, and facilitate or guide students toward learning for themselves. In fact I believe the most important role of an instructor is to teach students how to educate themselves. For example, I will utilize the concept of inductive teaching and learning in the classroom. In this mode of teaching, instead of telling students what to do or how to do something step by step, the students must try and figure it out themselves first. Of course I will help guide the students with their problem solving or thought process. I find that when most students are challenged but feel that coming up with a solution is possible, their interest and learning intensifies.

Teaching and Technology

There are several methods I will use to facilitate learning in the classroom. Technology will play a significant role in encouraging active participation while implementing these methods. For example, I will utilize Blackboard in my course by requiring students to participate in online discussions concerning readings that will be posted. This will facilitate student-student interaction which will promote the sharing of

ideas and thus learning from their peers. In addition I will utilize Power Point to share graphics of complex schematics which illustrate a measurement setup, scientific results, and/or phenomenological models. Finally, a personal response system (PRS) technology will also be used (if possible) to administer pop quizzes and/or periodic questions during class. This technology will engender student interest and active participation while providing immediate feedback for the students and myself allowing for frequent formative assessments of in-class and out of class learning.