Statement Of Teaching

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TEACHING PHILOSOPHY & APPROACH

Understanding mechanisms governing our universe, at all scales, have been my utmost lifelong passion. During my years at high school age, I gathered an impression that physics is an extremely difficult scientific discipline, accessible only to students with innate natural talent. However, with time and experience, I learned that although these subjects can be more abstract than others, an enthusiastic and devoted teacher can instill the excitement and awe of understanding of how the physical universe works. Thus, I am a strong believer that learning from a good teacher makes a significant difference in one's perception of the world. My main objective as a physics educator is not only to make sure that my students have graduated with at least the knowledge of the basic physics and be able to implement the knowledge in a real-world research problem. In my philosophy, to be able to effectively educate and train the students, it not only requires intense motivation, deep understanding and solid preparation but also to actively cultivate what works for students. My experiences in teaching have evolved around this philosophy that I will briefly describe below. My first teaching experience began as a laboratory instructor for undergraduate students. To share my knowledge effectively and troubleshoot the problems the students might have during their experiments, I practice the experiments beforehand, think about the possible questions students might ask and prepare answers to those questions, and check the functionality of the equipment. A key aspect of my teaching style is to engage the students in a more interactive learning approach i.e. to constantly engage the students in a series of brainstorming questionnaire. I realized modern students are often motivated and highly mesmerized by the functionality of the niche technological products that we use in our everyday life. Therefore, making a clear connection between technological breakthroughs and fundamental physics research gives students a better motivation and scientific understanding. I often use to capitalize these modern technological breakthroughs to excite the students to learn and motivate. For example, to connect physics to everyday experiences, I ask how to build electric generators using Faraday's law, or describe how the iPhone screen works by sensing changes in capacitance. When students realize the impact, they can have on their world by knowing how it works, they tend to be much more interested in continuing to learn about it.

TEACHING EXPERIENCES

So far, my formal teaching experiences involved teaching lower level undergraduate physics laboratory courses. During the time of August, 2009-December, 2010, I was appointed as a graduate teaching assistant at Southern Illinois University, Carbondale. During this time, I have taught several undergraduate level laboratory courses for the advanced university core curriculum courses PHYS 203A and PHYS 205A related to mechanics, heat, sound as well as PHYS 203B and PHYS 205B related to electricity, magnetism, light and aspects of modern physics. These courses are designed to meet requirements of physics, engineering and chemistry majors as well as a wide variety of non-science majors. Teaching these laboratory sections prepared me well for effectively teaching courses having students with a diverse backgrounds and knowledge base.

ADVISING EXPERIENCE

My teaching experiences has also extended to being a mentor of research projects to both undergraduate as well as graduate students. During my PhD studies at Southern Illinois University, I worked as graduate research assistant. During this time, I have had a wonderful opportunity to work closely with several undergraduates in the Research Experience for Undergrads (REU) program and entering graduate students in our research group. Starting from square one, I have taught them how to generate new research ideas through literature search, experimental system design, data analysis and scientific presentation and publications. I have worked carefully to strike a balance between interesting and exciting activities that can be completed by novice students given limited time and resources. The process of mentoring new students has been very enlightening. This experience not only taught me where to place my expectations and how to monitor the work and progress of beginning students but also how to build up a successful team spirit. These undergraduate and graduate students have presented their work in many international scientific conferences and published peer-reviewed papers. Recently, as a postdoc at University of New Hampshire, I have been working with several undergraduate and graduate students. Apart from my own independent research, part of my responsibility is to train and mentor their work. In this regard, I have been engaged to train and guide the students on how to build up experiments related to ultracapacitors, nanomaterial synthesis and device fabrication.

FUTURE TEACHING INTEREST

With my experience and qualifications in teaching, I believe I can immediately start to teach Introductory level Physics courses for undergraduate students in my first year of teaching. With a strong background in condense matter physicis, I can also teach Solid State Physics, Electricity and Magnetism, Quantum Mechanics and Statistical Physics classes in both graduate and undergraduate levels. In addition, I would like to develop classes in which students learn how to use specific computer programs such as LabVIEW, Origin, MATLAB in their research. Since I am an experimental physicist, I would like develop a course on Physics Laboratory Skills. I believe, this course can help undergraduate students get involved into any physics research groups and have some experience on graduate level experimentation.My research topic is about electrical and optical characterization of transistors,nano-material synthesis and characterization,bio-sensors and energy storage. Hence, in the near future I would like to develop and teach undergraduate and graduate level courses about Microsystems and Microelectronic manufacturing,Device Physics,Advanced optical

characterization of materials, Electronic Circuits and Biosensors etc. These courses can not only be taught in physics curriculam, but also in electrical engineering,materials science,mechanical engnineering and biomedical engineering program when the opportunities are given. In summary, I look forward to apply myself positively in developing and improving the teaching needs of a department in an academic institution of higher learning.