TEACHING PHILOSOPHY

Learning physics is a twofold cognitive process involving reasoning the concepts of physics and applying the concepts to solve the physics problems via quantitative reasoning. A successful learning experience implies an increase in students' ability to analyze a given physics problem and find the solutions to the problem. A good teacher acts as a coach and gatekeeper. As a coach, a teacher stimulates the intellectual curiosity of the students and teaches them some physics concepts via class demonstrations, interactive simulations, and active learning techniques. As a gatekeeper, a teacher sets up standards of competency for every student, which are written in the course syllabus.

Learning Goals and Teaching Methods

The transferable skills my students should take away after attending my classes are problem-solving, mathematical, numerical, communication, and writing skills. Each physics course has different sets of skill acquisition.

In General Physics courses, the students learn the three systematic steps to solve the elementary physics problems; draw all the required schematic diagrams and writing down all the known physical quantities (observables), establish the mathematical relationships between the physical observables, and calculate the value of unknown physical observables. A handout with gaps is the tool I employ to demonstrate these three steps. The students’ task is to fill the gaps while they are observing me solving the problems in class. I also give them an opportunity to discuss each gap with their peers and present their opinion in front of others.

In Computational Physics course, a student learns numerical algorithms to solve mathematical equations and translates the algorithms into codes using Python. After explaining the algorithms briefly, I write the code in Python and ask the students to analyze it. Their task is either to figure out how to make it shorter or to debug the code. Each group of three students also works on a final project and presents it at the end of the semester. While working as a group, the students practice communication skills by exchanging their ideas on how to improve the algorithms and write the codes efficiently.

In the Elementary Physics Lab course, groups of three students work on the experiments based on the lab manual. The groups discuss their observations using the concepts of physics they have learned in class, perform error analysis, and write a lab report.

Assessment Techniques

Different types of physics courses require different assessment techniques. In the General Physics course, I assess students' learning by giving weekly homework and quizzes, midterm exams, and a final exam. The weekly homework and quizzes are the tools for the student to self-evaluate their performance in class, while the midterm exams aim to prepare them for the final exam. In the Computational Physics course, I assess their problem-solving and numerical skills from the weekly homework and the final projects. In the Elementary Physics Lab course, using a rubric is an excellent method to assess a student's writing skills from their lab reports.

I prefer the absolute grading to the curved grading scheme to assign my final grades. I believe a final grade must be transparent and reflect the student's level of mastery of the learning objectives. This idea is extremely important as the student's proficiency in basic courses determines their capability in studying the advanced physics subjects.

Interaction with Students and Aspiration

I value my students more than just having their names on the attendance sheet. I always memorize their names and address them by their first name. Besides attending my office hours, I encourage them to email me right away if they face some problems keeping up with my classes. I promote a safe and friendly environment for students to ask questions and discuss them in class. My students describe me as approachable, knowledgeable, and objective. In my teaching evaluation, one of them wrote, "I really appreciated his teaching style. He will make a great professor."

I aspire to become a professor of physics, who is excellent in teaching and conducting research. I used to believe that the task of a teacher is solely to deliver the lectures in the classroom and it is a student's task to figure out how to keep up with the

class. My paradigm had gradually shifted since I attended the Graduate Student Teaching Intensive (GSTI) training when I was a graduate student at Western Michigan University (WMU). From the training, I learned some active learning and classroom management techniques and built my teaching portfolio. Since then, I have attended many workshops, online training, and read many books about teaching and learning. I now believe that the task of a teacher is to stimulate the learning process to occur, which is indicated by the active participation of the students in the class. I use student evaluations as an instrument to assess the effectiveness of active learning techniques I have applied in my class.

To sum up, I strive to be an effective teacher, who coaches his students to develop their transferable skills, which benefit their future careers, by implementing active learning techniques. Providing my students with a healthy learning environment is my mission as a teacher.