

Teaching Philosophy

I believe that everyone is born with an innate curiosity. When we follow this curiosity, we can experience the joy of discovering something new. By using different classroom settings, every student gets to discover how to harness the laws of physics to engineer the future, all while enjoying the process of learning something new. As the instructor in any classroom setting, I hope to use student centered learning to develop students' critical thinking abilities in a constructive learning environment where students give and receive feedback in the pursuit of understanding.

Student Centered Learning: How do I plan to implement this ideal class? This starts by transferring the focal point of my planning to be from my students' perspectives rather than my own. As each student has their own unique perspective, this requires me to consider how my material will be received from each of these perspectives. For example, I enjoy challenging students to find examples from their daily lives which relate to the course material. I did this in my thermodynamics course by using a self-assigned project in which the students used the laws of thermodynamics to answer an engineering question about a real life system. This project provided students the opportunity to bridge the gap between the textbook problems they learn and solve in class, and applying the knowledge to open-ended problems where there isn't a clear path towards a simple analysis. Because this enabled the students to incorporate the learning based on their own unique background, my students were more likely to relate to the class and be engaged as a result. Additionally, working with their peers gave them multiple perspectives, helping students to think critically about how their perspective affects their understanding of the material, and subsequently discover what they might be missing as a result.

Critical Thinking: While fostering student engagement, I also work towards developing the student as a critical thinker. I think the refinement of critical thinking is the most important part of an education since this skill is the cornerstone to self-directed learning, or a student's ability to learn on their own. A student who can think critically can evaluate the validity of any part of a logical process, from the assumptions made, the steps taken, all the way through to the conclusions drawn. In my engineering design class (ENGR 231), I use both the lecture and studio (or lab) time to develop this skill. In lecture time, I pause and ask students questions and give them enough time to reflect and respond. When dealing with more complex questions, I'll have the students pair up and discuss with each other for a few minutes, then hold a discussion with their answers. In the studio time, students assemble robotic arms and perform various tasks in preparation for a design project at the end of the course. This often requires the students to go through the troubleshooting process, which develops their critical thinking by defining the differences between the desired system operation and the actual system operation. As the instructor, I can help develop critical thinking by asking directed questions, such as asking them how they can determine if the issue is physical, software, or hardware related. Additionally, asking students to reflect on their debugging procedure after the fact can help develop metacognition and improve their critical thinking skills as well. Through these techniques and others, I hope to help students develop their critical thinking skills which will help them connect the general principles we teach in courses to how they are used in practice.

Constructive Feedback: Lastly, I believe that giving and receiving constructive feedback will empower students to pursue better understanding, rather than worrying about making a mistake. To encourage students to seek feedback, I want to be a role model by showing that I am open to feedback myself. I look forward to doing this with periodic anonymous check-ins that not only ask how the student is doing, but also what changes they would like to see in the class. This shows that I and my class are not perfect and need feedback to improve. In addition to receiving feedback from me, I also encourage students to work with their peers on assignments so that they have multiple avenues for feedback. I accomplish this by pairing them up for class activities, ranging from a quick conceptual Mentimeter quiz to a full problem analysis. By encouraging my students to seek and grow from feedback, I hope to establish my classroom as a laboratory for students to prototype their ideas and learn from their mistakes, so that they can pursue better understanding.

By centering on the three principles above—student-centered learning, critical thinking, and constructive feedback— I hope to establish my classroom as a laboratory for students to prototype their ideas and learn from their mistakes, so that they can pursue better understanding. I have found these principles well suited to my teaching style and serve as an effective strategy for developing students’ metacognitive abilities, which empowers them to be independent life-long learners. This mindset, in addition to the technical knowledge they gain during their time as students helps incubate graduates who are ready and excited to tackle their next engineering challenge, whatever that may be.

Job Solicitation:

In our approach to teaching, specifically, our four-year undergraduate engineering curriculum features courses in the first and second years that emphasize holistic design thinking and systems thinking to create engineering solutions that meet client's and community's complex needs while accounting for various social, economic, and environmental factors. Additionally, our two-year-long engineering project experience spans across the third and fourth years, providing our students a platform for customized learning in a focused area of interest. Several of these project teams participate in regional and national engineering student competitions.

- Emerge as an agile and adaptive educator who teaches throughout the four-year undergraduate engineering curriculum;
- Develop new engineering courses to complement and expand the undergraduate engineering curriculum's elective course offerings, including developing courses that may contribute toward any of the new engineering concentration areas;
- Mentor students effectively on undergraduate engineering projects;
- Develop an active scholarly agenda involving undergraduate students;
- Contribute collaboratively toward the operation and well-being of the institution as well as service to the profession in their area of expertise; and
- Integrate inclusive strategies across teaching, scholarly, and service activities.

Old Version:

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