The first paragraph summarizes their entire teaching philosophy into two principles.

Teaching and Mentoring Philosophy: My teaching and mentoring philosophy is defined by two central objectives. The first is to be an approachable, compassionate faculty member to ensure my students not only feel a sense of belonging in my classroom but identify themselves as meaningful contributors to the learning environment. The second is to demonstrate the goal of the classroom is mastery of engineering concepts to wield as tools in tackling real-world challenges.

Provides details clearly exemplify their methods + how they want students to feel in the classroom.

Gives an example of how their teaching methods have connected with students

Provides a citation to engineering education literature that validates the importance of their approach

Classroom Belonging: My teaching and mentoring philosophies are rooted in the belief that fostering an inclusive and supportive learning culture, coupled with hands-on experiences and personalized guidance, empowers students to excel academically, grow as individuals, and become confident and compassionate engineers. The intimate classroom settings at [School] allow for meaningful interactions, where instructors can truly get to know their students. I aim to create a classroom environment where students feel comfortable expressing their thoughts, asking questions, and seeking guidance on topics related to my courses and beyond by fostering an atmosphere of approachability and empathy. One way I plan to create this learning environment is by being transparent about my own experiences within academia as well as in industry. I have employed this practice as a teaching assistant, and students specifically called out the value of this in their anonymous instructor evaluations[1]. My unique experiences as a queer woman in the field of aerospace engineering have allowed me to develop a deep personal commitment to ensuring all students are empowered to bring their full and authentic selves into the classroom. From my own experiences, I know the culture created within classrooms can restrict students from being their authentic selves and create a sense of belonging uncertainty. The literature supports the importance of students feeling at home in academic environments, demonstrating that inclusion is paramount to students' academic success, sense of safety and comfort, and persistence in the face of challenges [1].

Lists the school they are applying to and connects how their teaching philosophy matches well with the school

Prioritizing Comprehension: In any classroom environment that I facilitate, I shall place less emphasis on route memorization to produce correct answers and more emphasis on a deep and comprehensive understanding of key concepts. I have leveraged this teaching philosophy throughout my time as a TA to the benefit of my students, as demonstrated by many students' comments in anonymous course evaluations[1]. By equipping my future students with a deep understanding of key concepts, they can approach complex, open-ended, and real-world problems for which there is no right answer with confidence. Furthermore, students can leverage their understanding of concepts within engineering to make connections between fields, which is particularly relevant at [School] where engineering is housed within the liberal arts context and interdisciplinary collaboration is an institutional value.

Teaching and Mentoring Strategies: The following sections briefly outline strategies I plan to utilize to foster equity and inclusivity in my future courses, rooted in research-driven insights for effective and reflective teaching pedagogy.

Continues to use citations to demonstrate knowledge of field + their understanding of challenges underrepresented students face

Active Learning: My teaching approach centers around student success, with a strong emphasis on active engagement, critical thinking, and real-world problem-solving skills. To achieve this, I will employ active learning techniques which involve student participation throughout lectures, encouraging students to become active participants in their own learning. These strategies have been proven to improve performance for all students, and especially those from backgrounds underrepresented in STEM [2][3], thereby fostering an inclusive classroom environment. During the spring of 2021, I was the lead teaching assistant

[1] See the complete record of my instructor evaluations on the final page of this document. [Excluded from example]

Lists teaching experience

for a capstone course in aircraft design, prototype manufacturing, and experimental analysis (16.821), offered remotely due to Covid-19. I worked with course instructors to develop a novel curriculum that could be completed remotely but still allow students to actively engage in deliberate practice with aerodynamics concepts by building and testing their own gliders.

Defines a key technical education term “scaffolding” to demonstrate their knowledge and educate any unaware readers

Describes their past teaching exp where they implemented scaffolding in the classroom

Scaffolding: One way I plan to implement active learning in the classroom is via scaffolding, wherein I demonstrate to students how to approach the problem-solving process by breaking down complex problems into approachable sub-tasks. Then, students are equipped with a framework of how to approach the problem at hand, and the support can be diminished gradually allowing students to apply the newly acquired problem-solving techniques. This technique has been demonstrated to improve student understanding of both the technical content and the problem-solving process itself [4]. Scaffolding serves as a bridge, effectively facilitating the transition from foundational concepts to their practical application, thereby mitigating the risk of students becoming overwhelmed and lost by enabling students to build their skills and confidence. I have had success employing this inclusive teaching practice while a teaching assistant for an introductory thermodynamics class by making explicit the steps of the problem-solving process during review sessions.

Answers the mentoring piece (e.g. research settings)

Connects what the classroom will look like when this technique is used

Growth Mindset: Finally, instilling a growth mindset is paramount in my educational philosophy. Encouraging students to embrace challenges and view failures as opportunities for learning and personal development is part of a larger objective of fostering a culture of belonging within the classroom. I plan to actively support growth mindset beliefs amongst my students by communicating clear and appropriate goals, developing thoughtful assessments, providing timely growth-orientated feedback [5]. While working closely with AeroAstro undergraduates as a Teaching Assistant, I have openly shared my own stories of challenges and failures in both classroom and research settings. By doing so, I aim to normalize the idea that failure is an inherent part of the learning process and can lead to new perspectives and problem-solving approaches. In a growth mindset classroom, effort is praised as the path to success rather than enate ability, which provides encouragement to students regardless of their starting point.

Statement of Values: By acknowledging and valuing diverse perspectives, I will create a safe space for students to express themselves, collaborate, and thrive. However, it is not adequate to only do inclusive practices. As a teacher, I aim to make explicit the *why* of pedagogical strategies I plan to leverage in the classroom. During my time in the Kaufman Teaching Program, I crafted an inclusivity statement that will be an integral part of my future syllabi and my research group. This statement is included in part below:

Shows a sample from a syllabus.

I firmly believe that diverse perspectives, experiences, and backgrounds enrich the learning experience for everyone involved. However, given the hurdles to diversity are cultural and systematic, we all must make a conscious effort to ensure everyone has equal opportunities to learn, contribute, and succeed. To do so, I shall outline a set of expectations to promote mutual respect and facilitate a collaborative environment that disavows discrimination in any form, as discrimination is a barrier to learning.

Talks about a specific population within the university setting and what measures can help them, supported by citations

Supporting the Existing Curriculum in the Department: I am particularly enthusiastic in teaching courses for first year students to ignite their passion for the engineering approach to problem solving. In introductory courses taken in the first year, I plan to emphasize self-regulated learning strategies. Self-regulated learning (SRL) allows students to actively manage their learning by setting goals, monitoring progress, and adapting strategies based on and outcomes [6]. For first-year college students, SRL is particularly relevant as it

Uses forward looking statements to indicate planned teaching techniques

Excellent opening sentence that highlights they are a capable teacher that could teach different types of courses

Explicitly lists courses from the school catalogue by name

Typically, teaching statements do not ask you to describe course development at length, but it also doesn't hurt to describe it either!

Describes a course they would like to develop at the school

provides a framework for metacognitive tasks such as reflecting on the usefulness of strategies and adapting those strategies for different contexts, which are shown to be most effective in improving student learning outcomes and increasing motivation [7]. I would implement SLR in a first-year course by having students develop goals at the start of the semester, conducting self-assessments wherein students can evaluate their progress at the mid-term, and then facilitating an end of semester reflection on the process. In my role as the institute Teaching Development Fellow for Mentoring [8], I am developing and presenting a workshop to graduate student research mentors on how to effectively incorporate self-regulated learning in mentoring undergraduate researchers.

Given the outlined strategies and my previous teaching experiences, I am well-equipped to support the broad and diverse course selection at [School], by both teaching classes within the core curriculum and developing novel interdisciplinary higher-level courses aligned with my research interests. Courses in the core curriculum that I would be well-suited to instruct based on my background and interests include Introduction to Engineering Design, Solar Energy Systems, Thermofluid Mechanics, Energy and the Environment, Fluid Mechanics, Heat Transfer, and Aerodynamics.

Course Development: In the Kaufman Teaching Certificate Program [9], I developed the necessary skills to develop new courses, including creating effective assessments, providing constructive feedback, and constructing student-centered syllabi. I plan to leverage backwards design, shifting the perspective from what the instructor intends to *teach* to the intended learning outcomes students shall *know deeply*. In doing so, the experience of the student is centered throughout the course development process, from shaping learning, to developing lectures and lab activities in support of those outcomes, to finally creating assessments to verify those intended learning outcomes. One way I have implemented backwards design in practice is in the creation of a syllabus[2] for a small uncrewed aircraft system (sUAS) design, manufacturing, and flight-testing course I developed in the KTCP. A goal of this project-based course course is to expose students to an authentic, real-world problem wherein a sUAS would provide value. Therefore, the final unit includes an industry standard Flight Readiness Review (FRR) where student design teams must demonstrate to the customer that they have sufficiently prepared the vehicle and its subsystems for a safe and effective flight test. To prepare students for this assessment, we shall explore documentation from NASA and other industry leaders and conduct ungraded “dry runs” to provide feedback to students before the formal and graded FRR.

In course development, I believe in harnessing the full potential of the campus and surrounding community as an extension of the classroom. By integrating real-world challenges and practical applications, students can gain a deeper understanding of the subject matter and its relevance in their lives. For example, a highlight of my time as an undergraduate was learning about thermodynamic cycles through a visit to the cogeneration facility. While serving as a teaching assistant for thermodynamics at MIT, I recalled the value of this experience and used the cogeneration facility at MIT as an example in my own instruction of thermodynamic cycles. Whenever possible, I hope to center courses that I create around design projects, such that students can develop their understanding of engineering skills in the context of how they would be applied in practice.

Courses that I would hope to contribute to the engineering curriculum at [School] include topics such as aircraft design, design optimization, and remote sensing. The first course on aircraft design shall provide students with a computational approach to aircraft design, as

[2] Syllabus can be provided upon request.

Explains how their proposed course would be structured

Justifies why they would be well-prepared to teach this course

Discusses how this course will benefit students

Explains some sample units, and the sort of problems that the course would study

modelling and optimization methods now dominate how aircraft design is conducted in industry based on industry trends and my own personal experiences. I plan to teach this course with a project-based approach with the backdrop of a real-world problem and an external client, such that students develop a true sense of how to work in teams, develop standard industry deliverables, and build engineering communication skills. The optimization course shall provide students with the techniques to mathematically represent and model engineering decision-making problems via linear, nonlinear, discrete, and global optimization frameworks to enable the transformation of complex challenges into optimal solutions. Students shall develop optimization techniques through real-world design challenges across mechanical, electrical, civil, and other engineering disciplines, transcending disciplinary boundaries and embracing the multidisciplinary nature of engineering at [School]. This course will leverage my experience with optimization by exploring how we consider multidisciplinary problems with multiple and often conflicting objectives. Furthermore, these optimization skills are increasingly important in a wide range of engineering roles, as the influence of computational methods expands in industry. Remote sensing is a valuable tool in the worlds of engineering and earth science, especially as satellite and airborne platforms for Earth observation become increasingly cost-effective and important to our understanding of our changing climate. The course shall emphasize the underlying physics, primarily pulling from the existing course in electromagnetic theory, to cover the basics of optical, thermal, radar and systems. This course shall also cover typical airborne and spaceborne remote sensing platforms, exploring how the trajectory of these platforms couple with the design and data collection ability of remote sensing systems.

References

[1]

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