

Ansys + University of Michigan

“When teaching Engineering 100, I’ve always discussed simulation in general and the role it can play in the development of many products. However, I hadn’t actually taught simulation in this class before, as the learning curve for conventional packages was not a good fit in light of the limited time we could devote to it in a survey course like this. Ansys Discovery has changed that. It allows our students to perform meaningful CAE simulation, using their own CAD modeling, and without taking long to learn. Being able to explore potential impacts of hypothetical design choices in real-time and without much training is a game-changer for students and even for many engineers.”

Prof. Kenneth Alfano

Lecturer in Engineering Undergraduate Education / University of Michigan – Ann Arbor, MI

First-Year Engineering Course at the University of Michigan Greatly Enhanced by Ansys Discovery Simulation

Our course gives students a comprehensive overview of the general engineering design process in a manner applicable to many fields. Because simulation is an increasingly vital tool in the design process across many industries and is now much easier and more intuitive to use with tools like Ansys Discovery, we are using simulation to enhance the first-year curriculum and introduce students to simulation as early as possible in their engineering education.

/ Challenges

- Provide a hands-on way for students to visualize how multiple engineering concepts come into play during the design process.
- Easily introduce simulation to first-year engineering students without the need of a stand-alone simulation course.
- Enable students to explore advantages and disadvantages of various potential design choices, in real time.
- Provide a tool for students to preliminarily evaluate their design concepts without physical prototyping.

/ Ansys Products Used

- Ansys Discovery

/ Engineering Solution

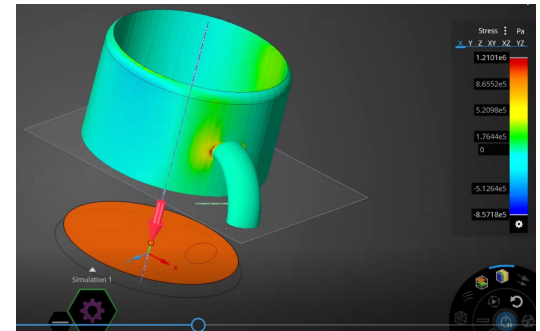
In 2021, our instructional team began doing lessons on structural and thermal CAE simulation using the “Explore” mode of Ansys Discovery. Our CAE assignments had the students use the files they produced from when they learned CAD modeling (in preceding lessons, based on Ansys SpaceClaim). Specifically, the students were guided through designing a coffee mug and then changing its dimensions and materials to evaluate the effects of such changes on stress and temperature throughout the mug. Some students opted to learn Discovery further and use simulation in their respective course projects.

/ Benefits

Ansys Discovery made it easy for us to incorporate and introduce basic simulation into the first-year engineering curriculum without students needing to take a separate, stand-alone simulation course. Its “Explore” mode in particular is highly intuitive, and allows rapid iterative changes with immediate results. So right after our students learn basic CAD and create a design, they get to see how various possible changes in their dimensions and materials could affect structural and thermal aspects throughout their product. Not only did this help students see the value of simulation as an integral part of the design process, but it provided an opportunity for them to see engineering concepts in action.

/ Description

The University of Michigan College of Engineering offers many majors while also emphasizing the interdisciplinarity of the profession. Its Engineering (ENGR) division provides courses that are not under any particular department, including ENGR100, which is a first-year course covering the overall design process. Different versions of ENGR100 are offered, and instructors teaching it come from many engineering fields.



Example from a class assignment on using Discovery to determine stress in a mug handle; screenshot is from a video lesson by instructional assistant Nadya Barghouty.



Kenneth Alfano, Lead Faculty of the ENGR100 class discussed here.

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