Project Title: Reconstructing Thermodynamics Instruction integrating Aspen Plus software

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Abstract

Thermodynamics is one of the core and most difficult classes throughout the engineering disciplines. The concepts are not easy and the students are challenged to connect the in-class lectures with real-life problems. The recent increase in the enrollment makes the teaching of Thermodynamics even more challenging. It is hard to keep students engaged and motivated using traditional lectures.

This grant helped me to:
1) Reconstruct my lectures introducing a “real-time” notebook
2) Integrate a chemical engineering software (Aspen Plus)

Introduction

Two of the most common students’ concerns are:
a) The in-class time is never enough to go over examples and problems in detail and the board lectures and slides are boring;
b) The connection of thermodynamic concepts and real-life systems is challenging.

The core of my teaching philosophy is to provide students an environment where discussion, teamwork, creativity and opportunities to practice their knowledge using real-world problems are priorities. Following this philosophy I applied two new strategies in my class. The strategies are shown and discussed in the next Figures.

Real-Time Notebook

In class lectures are performed with the use of “One Note”. The real time notes are projected on the board, as I am teaching and solving problems, and then they are uploaded directly on Husky CT. This way a “real time” notebook is generated, with Chapters, Sections and Pages of theory and problems, which is always available to the students.

Aspen Plus Simulations

After solving various problems in class, to ensure that the students fully understand the concepts, we move to more complicated problems, which are related to real-life systems. For the latter problems we use Aspen Plus. Aspen Plus is a software tool that helps engineers to simulate and optimize their systems. The students really appreciate the use of this tool, because they have the opportunity to design their system and apply their engineering thinking and knowledge.

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