

Building Concepts and Confidence with CHEMCAD™

University: Miami University | Oxford, Ohio, USA
Department of Chemical, Paper, and Biomedical Engineering

“After graduation, they won’t be designing distillation columns with pencil and paper. Instead, they will use state-of-the-art computational tools like CHEMCAD.”

- Professor Andrew Paluch

THEORY TO PRACTICE

Incorporating CHEMCAD into undergraduate courses has been a game-changer for both students and educators at Miami University. The complex equations and theories taught in chemical engineering can be challenging, often leaving students feeling overwhelmed and uncertain about their ability to succeed.

When Andrew Paluch of Miami University began integrating CHEMCAD into his curriculum, he noticed a significant improvement in student confidence and engagement with the material. With CHEMCAD, students could immediately see the impact of their decisions in a simulated environment, enhancing their understanding of fundamental principles.

CHALLENGES AND SOLUTIONS

Incorporating CHEMCAD into coursework not only enhances students’ understanding of chemical engineering concepts but also equips them with essential process simulation skills for their future careers. In the professional world, chemical engineers rely heavily on advanced computational tools like CHEMCAD to design and optimize processes. By introducing students to this software during their undergraduate studies, universities can better prepare them for the demands of real-world engineering careers.

COURSES USING CHEMCAD

Chemical Engineering Thermodynamics

The traditional study of Gibbs free energy models or equations of state, especially for mixtures, typically involves reading theoretical concepts from textbooks and referencing VLE handbooks. With CHEMCAD, students can interact with these models firsthand, experiencing the impact of model selection on the design of tangible components in a physical process.

Mass Transfer and Unit Operations

CHEMCAD allows students to test their conceptual understanding of the fundamentals behind separation processes and unit operations. By setting up simulations and analyzing the effects, students gain hands-on experience with real-world design challenges that would not typically be solved by hand. This practical approach builds their confidence and prepares them for engineering applications beyond the classroom.

Chemical Process Design

In this capstone course for seniors, the benefits of CHEMCAD are unmistakable. Students work in teams on design projects that require the use of a process simulator. With CHEMCAD, they can confidently explain various unit operations and discuss process design and optimization.

Preparing Workforce-Ready Students

Challenge

Familiarize students with CHEMCAD to better prepare them for the demands of real-world engineering careers.

Approach

CHEMCAD is used as a teaching tool in courses such as thermodynamics, mass transfer, unit operations, and process design.

Success

With CHEMCAD, students can immediately see the impact of their decisions in a simulated environment.

"I have found that more undergraduates are approaching me to get involved in research within my group, and they have been extremely effective in making contributions."

- Andrew Paluch, Miami University

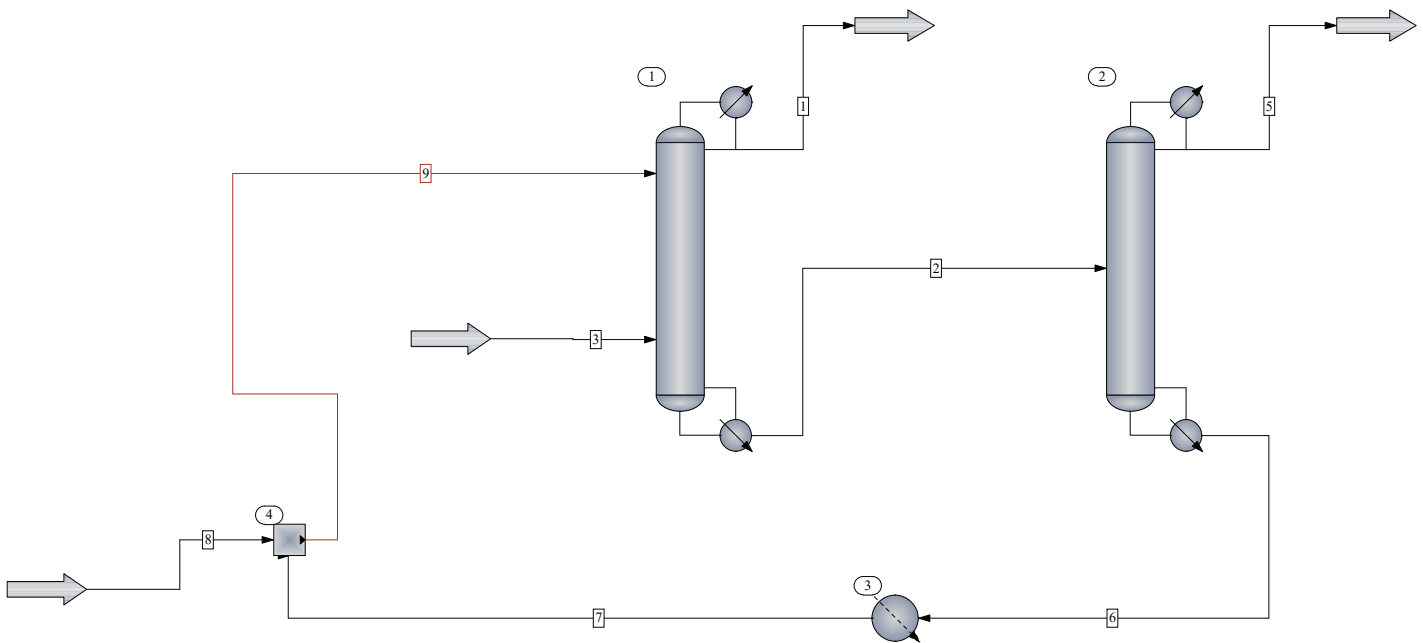


FIGURE 1

Example used in the Chemical Process Design unit:
Separation of an azeotropic mixture using extractive distillation.