

## ARTICLE FOR CACHE NEWS

# USING PROCESS SIMULATORS IN CHEMICAL ENGINEERING

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Updated versions of self-paced, multimedia, instructional materials, providing step-by-step procedures for using the ASPEN PLUS and HYSYS/UniSim process simulators, have been prepared by faculty from the University of Pennsylvania in Philadelphia and the Technion in Haifa, Israel. These materials are **available for free** via links on the CACHE website, [www.cache.org](http://www.cache.org).

These multimedia materials are well-suited to accompany the introductory McGraw-Hill/CACHE book by Professor Tom Adams, *Learn ASPEN PLUS in 24 Hours* (2<sup>nd</sup> Edition to be published later this year) – which motivates students to tackle process simulation problems, moving in sequence from simple to challenging and practical simulations undertaken in senior design projects.

For process unit models and flowsheet simulation strategies, our multimedia materials provide details using frame-by-frame tutorials that demonstrate their usage. Over the past year, all frames have been updated to use the latest user interfaces. Also, simulation examples have been updated and the contents enhanced (including tutorials on features in parentheses):

### **Principles of Flowsheet Simulation**

- Design Specifications
- Recycle Calculations  
(including nested recycles)
- Calculator  
(creating FORTRAN statements)
- Sensitivity Analysis  
(adjusting purge/recycle ratio)
- Optimization  
(optimizing purge/recycle ratio)

### **Separators**

- Split-Fraction Models
- Flash Vessels  
(phase equilibrium – VLE, VLLE)
- Distillation  
(adjusting reflux ratio to give distillate purity)

### **Heat Exchangers**

- Heat-Requirement Models
- Shell-and-Tube Exchangers  
(short-cut design, rigorous HX design)

### **Pumps, Compressors, and Expanders**

(Cont'd next page)

### **Chemical Reactors**

Stoichiometric Models

Chemical Equilibrium Models

(including multiphase chem. equil.)

Plug-Flow Tubular

(adjusting length to achieve conversion)

Continuous Stirred Tank

(exothermic CSTR – multiple steady states)

### **Physical Property Estimation Methods**

Data Banks

Equilibrium Diagrams

(including Txy, xy, phase envelopes, residue curves)

Property Data Regression

(nonideal VLE data)

Non-Conventional Components – Solids

(including cyclone separators)

**Two separate links are provided:**

ASPEN PLUS

<https://www.seas.upenn.edu/~cbe400/aspenn/>

HYSYS/UniSim

<https://www.seas.upenn.edu/~cbe400/hysys-unisim/>