

Overview:

This is a computer-based lab course that introduces undergrad students to useful modeling and analysis software/techniques. This is intended as a senior-level, fall semester course. It will build on fundamentals learned in previous courses and provide skills that will be useful in the capstone design course, and as practicing engineers.

(Prereq: Heat Transfer, Thermo)

Note on course name:

We just wanted to get a title on the special topics offering for this upcoming fall, but this course incorporates more than process modeling. Table 1 provides a breakdown of lab modules we plan to develop. We will think up a more fitting name in the future, and add more lab modules.

Objectives:

1. Provide students an in-depth introduction to modeling and analysis software packages/techniques that will be useful as practicing engineers
2. Teach students process modeling techniques and strategies that will allow students to develop their own functional process models (not based in commercial software packages)
3. Introduce students to commonly used databases and information sources that are helpful in developing process system models
4. Teach students to implement and interpret a multi-variable sensitivity analysis

Format:

- Computer-based lab course
- Students will choose 4 x 3-week lab modules from the list in Table 1.
 - LCA module is required for all students
 - One module must be a 'build your own model' module
 - The final 3-week module for all students will focus on multi-variable sensitivity analysis integrated with the 'build your own' model.
- Each 3-week module will be broken down (roughly) as:
 - Week 1: Intro to model package/technique (Students will follow provided materials)
 - Week 2-3: Students work on a mini design/analysis project (Teams of 2)
- Final exam for this course will be a presentation of the self-built model and multi-variable sensitivity analysis

Table 1. Lab modules under development

#	Module	Target Tracks	Software Options
1	Process modeling	CHP,ENC	Aspen, Chemcad
2	Wastewater treatment modeling	WAT,CHP	Biowin
3	Energy Systems modeling [†]	ENC, AIQ	Excel-based modeling, literature databases
4	Techno-economic modeling [†]	ENC, AIQ	Excel-based modeling, literature databases
5	Life Cycle Assessment	ALL (required)	SimaPro, BEES
Final	Sensitivity Analysis	ALL (required)	@Risk, Crystal Ball

[†] 'Build your own model' modules