



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Chemical and Biomolecular Engineering Unit Operations Laboratory I

CBE 3631

Credit Hours:

2.00 - 2.00

Course Components:

Lecture

Lab

Course Description:

Laboratory investigation of the operating characteristics and efficiency of chemical engineering equipment such as distillation, absorption, heat exchangers, and three phase mixing dynamics with mass transfer.

Prerequisites and Co-requisites:

Prereq or concur: 2523 (523) and 3610 (610), and enrollment in CBE major.

Course Goals / Objectives:

- Master the application of fundamental concepts from stoichiometry, thermodynamics, reaction kinetics, and transport phenomena to chemical engineering unit operations
- Be able to design and conduct experiments in the laboratory.
- Master the use of modern computational tools to analyze and interpret the collected data.
- Work effectively as a member of a team. Learn skills needed to be a team leader, including delegating duties and responsibilities.
- Prepare high quality written reports and oral presentations to summarize a project in a professional and informative manner.
- Be familiar with safety issues important in the chemical industry, including laboratory safety protocols, material safety data sheets (MSDS), and proper handling, storage, and disposal of chemicals.
- Become familiar with process flow simulators (ChemCAD) and master the ability to theoretically simulate the performance of the unit operation tested (including estimating capital and utility costs)
- Be able to compare results obtained with literature references
- Become familiar with the fundamentals of statistical data analysis (ANOVA, Regression Models, 2k Factorial Design, Response Surface Methodology for Optimization of Experiments)
- Become familiar with pilot scale and commercial scale instrumentation to measure flow, pressure, velocity, concentration, pH, temperature, conductivity, solubility, as well as fluid movers, such as pumps, compressors, fans, and blowers
- Become familiar with applications of process control systems
- Become familiar with basic principles of solving process problems in a plant setting
- Master fundamental principles of mass transfer equipment, with emphasis on distillation, absorption, and two-phase mixing dynamics
- Become familiar with basic principles of Emergency Vents
- Gain an appreciation for the complexity of chemical processes and the need for continuous learning in a practicing engineer's career.