



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Transport Phenomena III - Mass Transfer

CBE 3422

Credit Hours:

3.00 - 3.00

Course Levels:

Undergraduate (1000-5000 level)

Course Components:

Lecture

Course Description:

The transport processes involved in mass transfer will be outlined and governing equations derived. Modes of mass transfer (e.g., diffusion); Steady-state and unsteady-state mass transfer. The concept and use of mass transfer coefficients and the use of dimensionless numbers; mathematical analysis for the different mass transfer modes; analogies between heat, mass, and momentum transfer.

Prerequisites and Co-requisites:

Prereq: 3421, or permission of instructor.

Course Goals / Objectives:

- Describe the three modes of heat transfer and be able to write the empirical laws governing each mode
 - Understand the key physical properties governing heat and mass transfer
 - Be able to set up shell balances and surface balances for heat and mass transfer problems
 - Identify appropriate boundary conditions to solve the governing equations
 - Understand and apply the concept of analogies between different transport phenomena
 - Apply the finite difference technique to allow numeric solution of heat and mass transfer problems
 - Understand the concept and application of key dimensionless numbers in transport
 - Identify and apply the appropriate correlation to solve transport problems
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Course Topics:

- Mass Transfer Basics
 - Diffusivity; Fick's Law
 - 1D SS mass transfer
 - UMD; UCMD
 - Mass transfer with chemical reactions
 - 2D mass transfer
 - Mass transfer coefficients
 - Convective mass transfer
 - USS mass transfer
 - Finite Difference Methods
 - Gumley-Lurie charts
 - Dimensionless numbers and transport analysis
 - MT in staged columns
 - MT in electrochemical processes
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Designation:

Required