155: 502 **ADVANCED TRANSPORT PHENOMENA II** Spring 2000

Lectures: Tue 4:50am-7:30pm ARC 203

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Course Description: The purpose of this course is to provide fundamental instruction on the principles of transport phenomena as applied to mass transfer, diffusion and its treatment in stagnant and flowing media, two phase systems, and coupled reaction and mass transfer.

Office hours: Monday 5:00-6:30 pm
Wednesday 5:00-6:30 pm

Teaching Assistant: there will be no teaching assistant for this course.

Course Objectives:
1. Educate students to understand and been able to formulate and efficiently handle problems central to chemical industry related to mass transfer.
2. Get a clear description of diffusion.
3. Learn to couple heat and mass transfer with simultaneous consideration of chemical reactions.

Texts:
- *Diffusion: Mass Transfer in Fluid Systems* (strongly recommended)
By Cussler E.L.
Published by Cambridge U. Press, Second Edition, 1997 .
- *Transport Phenomena*
By Bird R., Stewart W. and Lightfoot E.
Published by Wiley, 1960
- *The Mathematics of Diffusion*
By Crank J.
Published by Clarendon Press, 1975

Prerequisites: Advanced Transport Phenomena I
Exams: *Homework assignments: 20%, Mid-term Exam: 35%, Final Exam: 45%*
Topics covered:

Week	Date	Topic
1	Jan. 18	Course Organization-Introduction Introduction to Diffusion
2	Jan. 25	Steady State Film Model Pseudo SS Diaphragm Cell Diffusion

3	Feb. 1	SS Radial Diffusion from Sphere Transient Diffusion into Semi-infinite Media
4	Feb. 8	Modeling Systems : GAMS
5	Feb. 15	Modeling of discrete and continuous decisions
6	Feb. 22	Mixed-integer linear programming
7	Feb. 29	Mixed-integer nonlinear programming
8	Mar. 7	Mid-term Exam
9	Mar. 14	Spring Break
10	Mar. 21	General Concept of Simulation for Process Design
11	Mar. 28	Introduction to algorithmic process synthesis
12	Apr. 4	Simultaneous optimization and heat integration
13	Apr. 11	Design and scheduling of batch plants
14	Apr. 18	Design and scheduling of batch plants
15	Apr. 25	Review class
	May. 4	**FINAL EXAM - 4:50pm - 7:30pm**