CHEE 6333: Transport Processes (Fall 2011)

Lecture: 4:00–5:30pm, TTh
Location: D3 E320
Catalog data: Cr. 3 (3-0).
Description: Advanced principles of fluid mechanics, heat and mass transfer with application to problems in research and design. Emphasis on unified view of transport process in laminar and turbulent flow situations.

Instructor: Dr. Jacinta C. Conrad (jcconrad@uh.edu), S226 Eng. Bldg. 1
Office hours: T, 9–10am or by appointment

Teaching Assistants:
Srimoyee Bhattacharya (srimoyee6@gmail.com), N45 Eng. Bldg. 1
Rahul Pandey (rahulpandey.79@gmail.com), S334a Eng. Bldg. 1

Textbook: Bird, Stewart, and Lightfoot, *Transport Phenomena*, 2nd ed, Wiley (2002).
Recommended Reading:

- Deen, *Analysis of Transport Phenomena*, Oxford (1998).
- Slattery, *Momentum, Energy, and Mass Transfer in Continua*, 2nd ed, Krieger (1981).

Topics:

- Momentum transport (9 classes):
  - Molecular view of momentum transport
  - Shell balances
  - Equations of continuity, motion
  - Steady-state and time-dependent 1-D flows
  - 2-D flows
  - Boundary layer flows
  - Turbulent flows
  - COMSOL examples

Exam 1: Thursday, September 22, 2011

- Heat transport (9 classes):
  - Shell balances
  - Equation of energy
  - Steady-state and time-dependent 1-D flows
  - 2-D flows
  - Boundary layer flows
  - Turbulent flows
  - COMSOL examples

Exam 2: Thursday, October 27, 2011

- Mass transport (8 classes):
  - Shell balances
  - Multicomponent equations of change
  - Steady-state and time-dependent 1-D flows
  - 2-D flows
  - Boundary layer flows
  - Turbulent flows
  - COMSOL examples

Final exam: Tuesday, December 13, 2011, 5–8pm

Evaluation:

- Homework: 20%
- Two exams: 20% each, total 40%
- Final exam: 40%

Learning Objectives:

- *Outcome 1*: Students will learn how to translate a physical description of a relevant process into a mathematical model for that process.
- *Outcome 2*: Students will learn how to translate relevant mathematical symbols into physical reality.
- *Outcome 3*: Students will learn several classic problems in fluid dynamics, heat transport and mass transport.

Exam policies:

- No calculators, cell phones, pagers, laptops, or PDAs.
- No makeup exams will be given.
- All regrade requests **MUST** be put in writing, and submitted at one time no later than one week after exams are returned.
- All questions on an exam submitted for regrading will be regraded.

Special dates:

- August 29, 2011: Last day to add a course.
- September 7, 2011: Last day to drop a course or withdraw without receiving a grade.
- November 2, 2011: Last day to drop a course or withdraw with a "W."
- November 23–26, 2011: Thanksgiving Break

Academic dishonesty:

- Please see section 3.02 for the University of Houston policy on academic dishonesty.
- The instructor takes academic dishonesty very seriously.