CHEE 6333: Transport Processes (Fall 2012)

Lecture: 4:00–5:30pm, TTh
Location: D3 E220
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 processes in laminar and turbulent flow situations.

Instructor: Dr. Jacinta C. Conrad (jcconrad@uh.edu), S226 Eng. Bldg. 1
Office hours: T, 9:30am–12:00pm or by appointment

Teaching Assistants:
Rahul Pandey (rahulpandey.79@gmail.com), S334a Eng. Bldg. 1
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Textbook: Bird, Stewart, and Lightfoot, *Transport Phenomena*, 2nd ed, Wiley (2002).
Recommended Reading: Deen, *Analysis of Transport Phenomena*, Oxford (1998).

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 27, 2012

- 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

Makeup class: Saturday, October 27, 2012

Exam 2: Thursday, November 1, 2012

- 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

Makeup class: Saturday, November 10, 2012

Makeup class: Saturday, November 17, 2012

Final exam: Tuesday, December 18, 2012, 5–8pm

Evaluation:

- Homework: 10%
- Two exams: 25% each, total 50%
- 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 how to solve 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:

- September 4, 2012: Last day to add a course.
- September 12, 2012: Last day to drop a course or withdraw without receiving a grade.
- November 2, 2012: Last day to drop a course or withdraw with a "W."
- November 21–24, 2012: 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.