

## CHEE 6333: Transport Processes (Fall 2015)

**Lecture:** 4:00–5:30pm, TTh

**Location:** 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 (jconrad@uh.edu), S226 Eng. Bldg. 1 (713-743-3829)

**Office hours:** T, 9:15am-12:00pm, or *by email appointment*

### Teaching Assistant:

Tian Gu (tgu2@uh.edu), S256B Engineering Building 1 (832-564-9605)

**Office hours:** Th, 9–11am

**Recitation Session:** Friday, 1–3pm in the Senior Room

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

**Recommended Reading:** Deen, *Analysis of Transport Phenomena*, 2nd ed, Oxford (2012).

### Topics:

- Math review (1-2 classes):
  - Vector and tensor notation
  - Vector and tensor calculus
- Momentum transport (10-12 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
- Heat transport (5-7 classes):
  - Shell balances
  - Equation of energy
  - Steady-state and time-dependent 1-D flows
  - 2-D flows
  - Boundary layer flows
  - Turbulent flows
  - COMSOL examples
- Mass transport (5-7 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

**Exam 1: Thursday, October 15, 2015**

**Exam 2: Thursday, November 12, 2015**

**Final exam: Tuesday, December 15, 2015, 5–8pm**

**Evaluation:**

- COMSOL Homework: 5%
- Two exams: 25% each, total 50%
- Final exam: 45%

**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 1, 2015: Last day to add a course.
- September 9, 2015: Last day to drop a course or withdraw without receiving a grade.
- October 30, 2015: Last day to drop a course or withdraw with a “W.”
- November 25–28, 2015: 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.