

CHE 231 Introduction to Transport Phenomena I: Fluids Spring, 2013

Credits:	3
Class Time:	Tue & Thu: 1:30 – 2:45 p.m.
Class Location:	SCOB 210
Recitation Time:	Fridays: 10:30 –11:20am (BA353), 12:00 –12:50pm (GWC465), or 1:30 –2:20pm (PSH152)
Instructor:	César I. Torres
Office:	GWC 548
Instructor E-mail:	cit@asu.edu
Office Hrs:	Tue: 11:00 – noon, Thu: 3:00 pm – 4:00 pm, and by appointment
Teaching Assistant:	Russell Urie
T.A. E-mail:	rurie@asu.edu
T.A. Office Hrs:	Mon: Noon-2pm, Wed: Noon-2pm at TBD
Grader:	TBD
Grader E-mail:	TBD
Required Text:	Fluid Mechanics for Chemical Engineers, 2 nd edition, with Microfluidics and CFD", by James O. Wilkes, Prentice Hall, Upper Saddle River, NJ, 2006.
Course Web Page:	Blackboard at MyASU
Prerequisites:	ChE 211, MAT 271

Course Objectives:

ChE 231 (Transport Phenomena I: Fluids) is one of the core chemical engineering courses. The aim of this course is to teach chemical engineering students the fundamental principles of fluid transport on a macro and micro scale (mass, energy, and momentum balances, fluid flows in pipes, differential equations of fluid mechanics, viscous flows, boundary layers, and turbulent flows). Students will be able to use mass, momentum, and energy balances to analyze and /or design fluid systems. After completing the class students will develop the skills to handle fluid flows problems of interest to chemical engineers.

Grading:

- **25% Homework**
 - Homework assignments will be assigned (for the most part) every other week on Thursday and due Tuesday of the next week. Check the schedule below for specific weeks in which assignments will be posted (on Thursday).
 - Homework assignments are due in class on their due date, no exceptions. I post the answer to the homework shortly after class, so I cannot accept late submissions.
 - There will be 8 assignments; one assignment will be dropped from the grade.
 - It is absolutely essential that you are able to communicate clearly and write neatly if you plan to work as a professional engineer.
 - Any diagrams, graphs or pictures should be neatly drawn and clearly labeled.
 - **Box your answers!**
 - If you turn in unreadable, messy, unclear, unreadable homework I will return it ungraded.

- **75% Exams**
 - 4 individual exams will be given in this class, including the final exam.
 - Only the 3 best grades in the exams will be counted for the final grade, with each exam counting as 25% of the class grade.
 - The “final” exam is not comprehensive and will count as one of these 4 exams, having the same value as the other 3 exams during the semester.
 - Exams are closed-book. However, you are allowed to bring one sheet (double-sided) containing important equations and concepts of the paper.
 - There will not be make-up exams, unless there is a justified reason for not taking it. In any case, one of the exams is dropped from the final grade.

Other Items:

1. Collaboration is acceptable for completing the homework assignments. However, it is expected that you will *do your own work* on each problem. ***Each student must complete all parts of the problem on their own.***
2. Students are required to be on time for class and not distract the fellow classmates or the instructor. Talking during class, as well as the use of cell phones, pagers, etc., is prohibited. If you need to make or take a call, you can leave the classroom, making sure you do not disturb the class.
3. Attendance to the recitation hours is required.
4. Students are expected to abide by the ASU Student Code of Conduct and Academic Integrity Policy (http://www.asu.edu/studentaffairs/studentlife/judicial/academic_integrity.htm).
5. Make sure to take advantage of office hours. I cannot make sure that every student understands the material given in every class. If you did not understand the material, come talk to me and I will do my best to explain.
6. I will use a standard grading curve, I do plan to use a limited +/- system as follows:
 - A+: > 97%
 - A-: 89.5 - 91%
 - B+: 87.5 - 89.4%
 - B-: 79 – 81%
 - C+: 77-78.9%

In order to get an A+, you must take all 4 exams and get at least 80% in all 4. The final grade, however, will still be calculated based on the best 3 exams grades.

Preliminary Course Outline and Schedule

Week	Subject	Reading	Homework (posted on Thu)	Exams
1/14	Introduction/ Static Fluids	Chapter 1		
1/21	Mass Balances	Chapter 2	HW 1 posted	
1/28	Energy Balances	Chapter 2	HW 2 posted	
2/4	Momentum Balances	Chapter 2		
2/11	Momentum Balances	Chapter 3	HW 3 posted	Exam #1 – Feb 13 Ch 1-2 (not including momentum balances)
2/18	Friction in Pipes	Chapter 3		
2/25	Flow in ChE Equipment	Chapter 4	HW 4 posted	
3/4	Flow in ChE Equipment	Chapter 4	HW 5 posted	
3/11	SPRING	BREAK		
3/18	Diff Eq in Fluid Mechanics	Chapter 5	HW 6 posted	Exam #2 – Mar 18 Ch 2 (momentum balance)-Ch 3
3/25	Viscous-Flow Problems	Chapter 6		
4/1	Viscous-Flow Problems	Chapter 6	HW 7 posted	
4/8	Boundary Layers	Chapter 8		
4/15	Boundary Layers	Chapter 8	HW 8 posted	Exam #3 – April 17 Ch 4 & 6
4/22	Turbulent Flow	Chapter 9		
4/29	Turbulent Flow/Final Review	Chapter 9	HW 9 – not for grade.	
May 8th				Final - Exam #4 (12:10-2:00pm) Ch 8 & 9