

AME 530a: Dynamics of Incompressible Fluids (3.0 Units)

Fall 2015

2:00-3.20pm Monday and Wednesday, OHE 100C

Instructor: Prof. Mitul Luhar (luhar@usc.edu)
Office Hours: OHE 400C, 3.30-5.00pm Monday and Wednesday

TA: TBD
TA Office Hours: TBD

Textbook:

There is no required text for this class, but *Fluid Mechanics* by Pijush K. Cundu and Ira M. Cohen (Academic Press) is highly recommended. Readings will be suggested from this book to complement the material covered in class.

Topics Covered:

1. Continuum viewpoint
2. Fluid statics
3. Conservation laws and control volume analyses
4. Inviscid flows
 - a. Potential flows: lift, drag, and thrust
 - b. Potential flows: waves
5. Navier-Stokes equations and viscous flow
6. Similarity, dimensional analyses, and Reynolds number
7. Stokes flow
8. Boundary layers and separation
9. Vorticity and circulation
10. Instability
11. Introduction to turbulence

Grading:

Homework: 30% (6 total)
Midterm Exam 1: 20%
Midterm Exam 2: 20%
Final Exam: 30%

You are allowed to discuss homework problems with each other, but your solutions must be your own. Please indicate on your homework assignment if you have worked with another student. Assignments that are late will be penalized 25% for each day after the due date. All exams will open-notes. Please notify the instructor ahead of time if you are unable to attend an examination or meet a homework deadline.

Gallery:

This year we will be running a *Gallery of Fluid Motion* competition. Students are encouraged to capture images of fluid flow as they go about their day-to-day activities (milk in coffee, cloud formations, waves etc.), and send it to the instructor, along with a brief description. The students who provide the top 5 entries (as judged by your peers) will receive 5% towards their grade and their lowest-scoring homework assignment will be discarded.

Piazza:

We will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email team@piazza.com.

Find our class page at: <https://piazza.com/usc/fall2015/ame530a/home>

Academic Conduct:

Plagiarism - presenting someone else's ideas as your own, either verbatim or recast in your own words - is a serious academic offense with serious consequences. Other forms of academic dishonesty are equally unacceptable. All USC students are responsible for reading and following the Student Conduct Code, which appears in the Scampus (<http://scampus.usc.edu/>).

Support Systems:

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute (<http://dornsife.usc.edu/ali>), which sponsors courses and workshops specifically for international graduate students.

The Office of Disability Services and Programs (<http://dsp.usc.edu/>) provides certification for students with disabilities and helps arrange the relevant accommodations.

If an officially declared emergency makes travel to campus infeasible, USC Emergency Information (<http://emergency.usc.edu/>) will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity (<http://equity.usc.edu/>) or to the Department of Public Safety (<http://adminopsnet.usc.edu/department/department-public-safety>). This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can initiate the report on behalf of another person. The Center for Women and Men provides 24/7 confidential support (<http://engemannshc.usc.edu/cwm/>), and the sexual assault resource center webpage describes reporting options and other resources (<https://sarc.usc.edu/>).