

[Version 1.0 - updated April 30, 2015]
AME 309 - Dynamics of Fluids (4.0 units)
Syllabus for fall semester 2015
Tue,Thu 10:00-11:50am, MHP 106

Instructor: Prof. Veronica Eliasson, eliasson@usc.edu.

Office hours: RRB 220, Tuesday 2-4pm & Wednesday 1:00-3:00pm.

TA: TBA

Office hours: TBA

Textbook: Frank White, Fluid Mechanics, 7th Ed, McGraw-Hill, Inc.

Grading:

Homework: 1/5 of final grade.

Project: 1/5 of final grade.

Midterm exams: $2 \times 1/5$ of final grade.

Final exam: 1/5 of final grade.

Topics

1. Characterizing a fluid and the state-of-stress in a fluid. (Week 1)
2. Fluid statics: manometry, forces on submerged surfaces. (Week 2-3)
3. Conservation of mass. (Week 4)
4. Conservation of momentum. (Week 5)
5. Conservation of energy. (Week 6)
6. Bernoulli's equation along a stream tube with and without losses. (Week 6)
7. Concepts from dimensional analysis. (Week 7)
8. Equations of motion in differential form. (Week 8)
9. Flow in pipes and ducts with losses. (Week 9)
10. Boundary layer flows. (Week 10)
11. Flow past bluff bodies. (Week 11)
12. Flow in open channels (friction, channel transitions, hydraulic jumps). (Week 12)
13. Compressible flow (subsonic & supersonic flow, shock waves). (Week 13-14)
14. Review and catch up. (Week 15)

Discussion Board

This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA's, 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.

Midterm

There will be two midterm exams in the course.

Project

A soda bottle water rocket project will take place in the second half of the semester. Here is a link to a previous rocket launch: <http://vimeo.com/81151514>.

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://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html 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.

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. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

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://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. 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 help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.