OCEN 678

Fluid Dynamics for Ocean and Environmental Engineering
Fall 2009, MWF 1:50-2:40 in CE 203

Instructor: Dr. Scott A. Socolofsky
Office: CE/TTI 802B
Office Hours: W 3:15-4:30, R 2:30-4:00 or by appointment via email
Telephone: (979) 845-4517
Email: socolofs@tamu.edu

Fluid Dynamics for Ocean and Environmental Engineering. (3-0). Credit 3. Central conservation laws; Navier-Stokes equations; steady and unsteady Bernoulli's equation; potential flow theory and basics of panel methods; laminar and turbulent boundary layer; transport equation in laminar and turbulent flow; flow past a body of any shape; scale analysis and the art of approximation. Prerequisite: CVEN 462 or approval of instructor.

Learning Outcomes. By the end of this course, students will be able to construct solutions to fluid dynamics problems applicable to their research using methods from the fluids literature. To achieve this goal, students will learn to
- Categorize solutions to fluids problems by their fundamental assumptions
- List and explain the assumptions behind the classical equations of fluid dynamics
- Identify and formulate the physical interpretation of the mathematical terms in solutions to fluid dynamics problems

1. Textbooks and Other Resources

There is no required textbook for this course. Instead, resources from a number of books have been made available through the university library reserves. Some of the content is available online, while other resources are through hard copy at the reserves desk. You may access all of this material through the library reserves website for this course at

- http://library-reserves.tamu.edu/ then search for either Socolofsky or OCEN 678

Each of the items available through the library reserve is detailed in the reserves list handout. The lecture handouts for each lecture detail which reading material applies to each lecture.

2. Tentative Course Calendar

The attached table presents a tentative course calendar. In addition to the weekly class meeting times, three important dates should be noted:
- Exam 1: Tensor notation and the governing equations. Distributed 9/30/09 and due in class on 10/2/09 at 1:50 p.m.
- Exam 2: Viscous Flows. Distributed 10/28/09 and due in class on 10/30/09 at 1:50 p.m.
- Exam 3: Potential Flows. Distributed 11/30/09 and due in class on 12/2/09 at 1:50 p.m.
3. Homework Assignments

Homework assignments will be problem sets. These will be hand-written assignments solving problems related to the lecture material. These assignments will be graded by the instructor and returned in a timely manner. The problems in the homework will be similar to exam problems, but often with more details than can be covered in an exam setting.

You may ask others for help at places where you have made diligent attempts and have become stumped. You may ask others for confirmation of results at significant milestones in the problem. However, direct copying of solution sets or other’s papers will not be permitted (see Academic Integrity below).

Homework due dates will be announced when the homework assignment is distributed. Generally, homework is assigned on a weekly schedule. No late homework will be accepted.

4. Course Project

There will be one course project that will be due on the day of the final exam. The project tests the main objective of this course, which is that students should be able to read and understand the research literature on fluid mechanics after completing this course. The project will require students to select one journal paper which address a topic in this course. Students will work in groups of two. The final project will consist of a conference-quality poster presentation and 15 minute oral seminar-quality presentation. Details of the course project will be handed out in a separate assignment description.

5. Grading

Your final grade for the course will be calculated as follows:

- Homework: 20%
- Exams: 20% each
- Final project: 20%

Letter grades will be assigned from your total course score according to 90% to 100%: A, ≥80% but <90%; B, ≥70% but <80%; C, ≥60% but <70%; D, below 60%: F.

6. Class Participation and Quizzes

You are expected to attend all classes, turn in all assignments, and complete all exams at their scheduled times. Exceptions are only permitted for University Excused Absences as described above in Homework Assignments.

Classes will start on time, and pointers for the homework assignments and last-minute changes to the schedule may be announced in class. It is your responsibility to be in class to receive this information or to get the information from another student.

7. Exams

Three take-home exams are scheduled (see the Tentative Course Calendar above for scheduling). The grading of the exams will be based on both the approach and the final answer. Exams will be open book and open notes, but no collaboration whatsoever is permitted.
8. Plagiarism and Cheating

“An Aggie does not lie, cheat, or steal or tolerate those who do.” Students are expected to understand and abide by the Aggie Honor Code presented on the web at:

- [http://www.tamu.edu/aggiehonor/](http://www.tamu.edu/aggiehonor/)

No form of scholastic misconduct will be tolerated. Academic misconduct includes cheating, fabrication, falsification, multiple submissions, plagiarism, complicity, etc. These are more fully defined in the above web site. As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have permission of that person. Since the problem sets and programming assignments grade for this course is a high percentage of your total grade, no plagiarism or cheating will be permitted in the homework. Violations will be handled in accordance with the Aggie Honor System Process described on the web site.

9. Absences

The university views class attendance as an individual student responsibility. Students are expected to attend class and to complete all assignments. Instructors are expected to give adequate notice of the dates on which major tests will be given and assignments will be due. For more details, please read Part I, Rule 7 of the Texas A&M University Student Rules at

- [http://student-rules.tamu.edu/](http://student-rules.tamu.edu/)

Please contact me as soon as you know you will miss a class or an exam so that a reasonable alternative can be accommodated. Unexcused absences will result in a grade of zero for the missed work. The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence.

10. Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.