

# SYLLABUS - CE319F

## ELEMENTARY MECHANICS OF FLUIDS

Unique #: 15585, 15590, 15595, 15600, 15605, 15610

Fall 2013

Room: ECJ 1.204 (labs are in ECJ Basement 112A)

T Th 9:30 to 10:45 a.m.

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### Instructor Information

**Professor:** Richard L. Corsi, Ph.D., P.E.

**Office:** ECJ 9.102H (end of hall)

**Phone:**

**Office Hours:** T Th – 2:30 to 4:30 p.m.

**Email:**

or by appt. or whenever office door is open

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### Pre-Requisites

EM 306 (or EM 306S) - Static Mechanics. EM 306 has as pre-requisites M 408D and Physics 303K/103M. Students will be expected to draw on materials from these courses in CE319F.

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### Textbook Information

Yunus A. Çengel and John M. Cimbala, *Fluid Mechanics: Fundamentals and Applications*, 3<sup>rd</sup> edition, 2014.

Important information related to the textbook:

There are differences between the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> editions of the textbook. These include corrections of errors that existed in the first and second editions, changes in the type and numbering of homework problems at the end of each chapter, and some revisions to the general text and section arrangement. It is the responsibility of each student to make sure that they complete reading assignments and homework assignments consistent with the 3<sup>rd</sup> edition of the textbook (not the first or second editions).

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### Exam Schedule

**Exam 1: Th Oct 10, 2013**  
9:30 to 10:45 a.m.

**Exam 2: Th Nov 14, 2013**  
9:30 to 10:45a.m.

**Final Exam: Sa Dec 14th, 2013**  
7:00 a.m. to 10:00 p.m.

See pages 5 and 6 for important information on exam policies.

## Office Hours

I strongly believe in the benefits of meeting with students in small groups, and encourage every student to visit me during my office hours to discuss homework problems, general course concepts, and other issues related to the engineering profession or education. **My office hours will be T and Th from 2:30 to 4:30 p.m.** I often work problems with groups of students in my office or the small conference room near my office. I will do my very best to make appointments with students who can not attend regular office hours, and if my door is open at any other time you are more than welcome to visit.

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## Other Members of the Team: Teaching Assistants, Tutor and Grader

**Teaching Assistants:** To be announced.

The teaching assistants will prepare and coordinate laboratory sessions. They will not have office hours.

**Tutor:** To be announced. This course may have a tutor who will hold office hours that, to the extent possible, do not conflict with my office hours, lecture times, and lab times.

**Grader:** A homework grader has been assigned to the class. Students should not consult the grader. Please see me if you have questions about the grading of a homework assignment. I am fair and will give you back points if deserved.

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## Course Overview

Fluid mechanics is a basic engineering science that covers materials that are fundamental for civil, architectural and environmental engineers. The principles of fluid mechanics are essential for understanding phenomena related to the movement and forces established by and on fluids such as air and water, for designing systems that employ these fluids, and for predicting the transport of pollutants in fluid streams, e.g., rivers, oceans, buildings, and the outdoor atmosphere.

The course description from the Undergraduate Catalog is “*Fluid properties, hydrostatics, elements of fluid dynamics, energy and momentum, boundary layers, similitude, pipe flow, metering instruments, drag forces.*” Specific topic areas that will be covered in this course include: properties of fluids, pressure, fluid statics, fluid kinematics, conservation of fluid mass and energy, dimensional analysis and similitude, and closed conduit flow. Time permitting we will also cover drag forces and applications related to pollutants in buildings.

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## Subject Matter

Lecture-by-lecture subject matter, reading assignments, and homework assignments are provided in a Course Outline appendix to this syllabus.

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## Academic/Learning Goals

The intent of this course is to provide an introduction to the field of incompressible fluid mechanics; some compressible flow phenomena will also be discussed, but primarily to show the contrast between incompressible and compressible flows. Students should become familiar with a breadth of topics related to fluid mechanics, thus allowing for more in-depth analyses in required civil engineering courses, e.g., CE356 (hydraulics), and 4th-year elective courses in both civil and architectural engineering. Students should also become more familiar with the types of problems that involve elementary fluid mechanics, and should be able to identify the intellectual tools (fundamental concepts) that are available to address these problems. Many of the tools that students gain from this course should be directly applicable to future problem solving as a practicing engineer. Fill your intellectual toolbox. It will come in handy throughout your career.

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## Assessment of Academic/Learning Goals

Academic learning goals will be assessed by student performance on 22 homework assignments and three exams, as well as attendance and participation in laboratories. Students will also have an opportunity to provide feedback on end-of-semester evaluations and are encouraged to speak with me to provide feedback on goals and assessment during the semester. Specific grading policies are summarized below.

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## Grading Policies

A +/- grading system will be used for final grades in this course.

### Basis of grading in this course:

* Homework	15%
* Laboratory	10%
* Exam 1	20%
* Exam 2	25%
* Final Exam	30%

### Letter grades will be assigned as follows:

* A	92 – 100%
* A-	89 - 91%
* B+	86 – 88%
* B	82 - 85%
* B-	79 - 81%
* C+	76 – 78%
* C	70 – 75%
* C-	67 - 69%
* D+	64 – 66%
* D	58 – 63%
* D-	55 – 58%
* F	< 55%

There is no set grading curve in this course. If every student earns an A mark, every student will receive an A mark. The key word is “earns”. You will need to work hard in this course to earn a good grade. We will cover a lot of material, and the course is **homework intensive**. Falling behind in this course, missing a lot of lectures, or not working hard almost always leads to a poor grade. Copying homework solutions from other past or present students is considered both unethical and not particularly smart with respect to truly understanding course material. See me if you are struggling with homework problems or course concepts.

**Very Important Note:** To qualify for a grade of C or better in this course a student must not miss any more than 3 labs AND must also receive a mark of 70% or higher on the total homework assignment mark. Keeping up on laboratories and homework is important! I do not waiver on these requirements.

## Lecture and Laboratory Attendance Policies

**Lectures:** Lecture attendance is expected, but will not be formally documented. Be warned that poor attendance is likely to adversely affect your grade in this course, particularly as related to performance on exams. There is *substantial* empirical evidence to support this.

**Laboratories:** There are 11 **mandatory** laboratory sessions during the semester (see course outline). Laboratories are designed to reinforce and build upon concepts discussed in lecture. *Attendance of laboratories is required.* The teaching assistant will monitor attendance for each laboratory. **A penalty of 2% (absolute) to the final mark will be assigned for each lab session that a student fails to attend**, up to a total of 10% (maximum). However, **if a student fails to complete four or more laboratories, s/he will be ineligible for a grade of C or higher in the course**, i.e., the highest grade possible will be a D+. If for some reason you need to miss your lab session one week you should contact me the week prior or earlier and I will arrange with the teaching assistants for you to attend a different lab during week in question. Do not coordinate this directly with teaching assistants.

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## Supplementary Work Policy

The instructor will not provide supplementary work as “make-up” for poor grades or missed assignments/exams.

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## Homework Policies

### Homework submittal

Homework is due **by 4:30 p.m. in ECJ 8.6 (CE319F Corsi HW metal box on wall)** each Wednesday and Friday unless otherwise noted on the course outline. This schedule is intended to allow for students to review assigned problems and to ask me for assistance prior to the due date and time. Due dates for each assignment are listed on the attached CE319F lecture and homework plan. I will **not** accept homework delivered under my door, in campus mail, or by email. I will accept homework if handed to me during our regular lecture time and will place it in ECJ 8.6 for you. Note that ECJ 8.6 is only open during the normal M-F workday, so plan accordingly.

### Homework format

The format for submitted homework will mimic the expectations of a professional workplace. An engineer’s job is not done unless the steps to the solution of a problem are adequately communicated so that someone else can evaluate all steps in your work (avoid “leaps” over multiple steps). All homework must be neatly handwritten, preferably on standard engineering paper. Your name must be in the upper right-hand corner of **every page**, along with the **homework assignment number** and **page number**. Multiple pages of homework must be **stapled** in the upper left-hand corner. You should leave room on the bottom right corner of the last page of your assignment for the reader to enter an overall mark for the assignment. This will allow for return with grade anonymity. You should also write your name on the back of the last page of your assignment.

Each homework problem must contain (1) a problem statement, (2) a sketch of the problem (where appropriate), (3) labels and definitions for all known and unknown variables, (4) governing equations and any manipulations of governing equations required to arrive at a solution, and (5) substitution of dimensional quantities (with units) into equations for the final answer. **Homework must be neat.** Solutions must be presented in an orderly fashion; anyone should be able to understand your solution six months or sixty years later. It is good practice to write equations in general symbol form before specific numerical values are substituted into the equations. All dimensional quantities (in the given information and solution) must have the appropriate units following the numbers through the solution steps. Final answers must be clearly marked (underlined, boxed, or arrowed). It is

worthwhile to practice good presentation of your work now, as it will be expected after you graduate. So, be neat. Be organized. Help your reader!

**For each assignment each student will also develop his/her own problem relevant to the topic material** for that assignment and will submit *the problem statement and solution* after solutions to textbook problems. This problem should be labeled “Your Name Problem X”, e.g., Corsi Problem 1 (here, X refers to the actual homework assignment number). “Your Name Problem X” will be graded on each homework assignment as if it was an actual textbook problem. The “X” on each assignment in the accompanying Course Outline is a reminder to complete this problem. The intent of this exercise is to challenge you to think of problems of interest to you that are relevant to the basic principles discussed in the classroom, and to realize your own growth in the subject matter as the semester evolves. I am also very receptive to having students visit me during office hours to discuss the development of “Your Name Problem X” problems. This process can be a great learning experience in terms of reinforcement of course concepts, and so I encourage every student not to simply find problems in other books. Take the opportunity to be creative, explore, and have fun while learning. To encourage your creativity the top five “Your Name Problem X” problems (based on creativity and correctness) on each assignment will receive five bonus points on that assignment. The grader will nominate problems and I will make final decisions on “Your Name Problem X” awards.

### **Homework Grading and Policy**

Points will be assigned for each homework problem as follows:

- (a) Clear and complete presentation with correct answer - 5 points
- (b) Clear and complete presentation (generally correct approach) with incorrect answer - 4 points
- (c) Honest attempt but clearly incorrect approach and answer – 2.5 points
- (d) Poor attempt or solution altogether missing - 0 points

A penalty of up to 2 points per problem may be assigned for failure to follow the guidelines listed above.

**Late assignments will NOT be accepted.** The only exception will be for health problems that are documented or observance of religious holidays (which should be brought to my attention at least a week before the holiday). If you need to attend a family reunion, wedding, or other such event you should plan accordingly and submit your assignment prior to your departure.

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## **Exam Policies**

There will be a total of three exams in the course, two exams during the semester and a comprehensive final exam. Exam dates and times are listed earlier in this syllabus and in the course/topic outline.

The exams will be closed book and closed notes. However, each student will be allowed to bring one (1) ***hand written*** 8.5 inch x 11 inch sheet of paper to each of the first two exams, and three to the final exam. Each side of the paper may be written on. These sheets **MUST** be submitted with the exam and must include your name. Sheets for the first two exams will be returned to students with graded exams. Conversion factors, physical properties of fluids, and trigonometric formulas will be provided on the exam as needed. Students may be required to perform calculus level mathematics on each exam. The second exam will be comprehensive, but will weigh more heavily on material covered after the first exam. The final exam will be comprehensive, with approximately 50% of the exam being on material covered after the second exam, 25% on material prior to the first exam, and 25% on material prior to the second exam.

The time remaining on the exam will be announced prior to the end of an exam. At the stop time I will call “time’s up”. You **MUST** submit your exam at the announced end time. I will leave the room shortly after the announced end time. Absolutely no exam or exam material will be accepted after I leave the room.

Medical illness (or comparable situation such as a death in the family) or observance of religious holidays will be the **ONLY** excuses for being given an opportunity to complete a make-up exam. In these cases, definitive evidence of circumstance (letter from doctor, etc.) must be provided to me. If you miss an exam for reasons other than medical illness or religious holiday a grade of zero will be assigned to the exam. See separate section below for religious holy days.

If, after an exam has been graded and returned, you have questions about the grading, you must write your questions or comments on a separate sheet of paper and submit these questions/comments to me along with the graded exam. Exams will be accepted for re-evaluation for up to 8 calendar days after the exam is returned (no exceptions). Final exams will not be returned. Students may view the final exam by appointment with me.

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## Laboratory Policies

Weeks in which laboratories will be held are noted on the course topic outline. You should assume that there will be a laboratory during each of these weeks unless otherwise stated in lecture. Materials necessary for laboratory completion will be posted on the Blackboard website and should be downloaded prior to attending your assigned laboratory. Laboratory attendance policies are listed on pages 3 and 4 of this syllabus.

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## Scholastic Dishonesty Policy

I have a strong belief about personal responsibility and ethical academic behavior. Any student who is found to engage in unethical behavior related to this course, including the acts of cheating on exams or laboratories, tampering with other student's assignments, plagiarism, etc., will be penalized in accordance with the severity of the act. Penalties may be as severe as receipt of zero on assignments or exams, failure of the course, or worse. The official Cockrell School of Engineering policy is that students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. **Work hard. Be honest. Explore. Learn.** For further information see: <http://deanofstudents.utexas.edu/sjs/>.

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## Access to Computers

All students registered in this course must have an email account on the university network. You may use your existing account or you may obtain a University email account. I will be communicating via email with the class a lot (you might even get sick of me!). You are expected to check your email on a regular basis. Please include CE319F on the subject line of any email that you send to me – this will ensure your email will not get thrown out as spam.

**Additional materials for this course will be on the course Blackboard site.** The course syllabus, handouts, assignments, and PowerPoint presentations are examples of the types of information that may be available on this site.

The Department of Civil, Architectural and Environmental Engineering has a microcomputer laboratory, the Learning Resource Center (LRC) on the third floor of ECJ. The LRC is available for you to use. Assistants in the LRC are there to operate the microcomputer laboratory and to respond to specific software and hardware problems. Typically, LRC assistants do not have detailed knowledge of material related to CE319F and should not be consulted on course-specific material.

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## **Course/Instructor Evaluations**

An evaluation of the course and instructor will be conducted at the end of the semester using the approved UT Course/Instructor evaluation forms.

I am also very receptive to suggestions by students during the semester and do not hold constructive criticism against students.

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## **Students with Disabilities**

The University of Texas at Austin provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259 (voice) or 512-410-6644 (video phone) or <http://www.utexas.edu/diversity/ddce/ssd>.

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## **Cockrell School of Engineering Drop Policies and Important Dates**

From the 1st through the 12th class day, an undergraduate student can drop a course via the web and receive a refund, if eligible. From the 5th through the university's academic drop deadline, a student may Q drop a course with approval from the Dean, and departmental advisor.

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## **Religious Holy Days**

A student who misses classes or other required activities, including examinations, for the observance of a religious holy day should inform the instructor as far in advance of the absence as possible, so that arrangements can be made to complete an assignment within a reasonable time after the absence.