

**CE 2375: Introduction to Thermal-Fluid Science  
Fall 2022**

Class Reference Number:	12558
Class Meeting:	12:00-1:20 pm, MW
Class Room:	College of Business Administration 319
Textbook:	Fluid Mechanics, 2 <sup>nd</sup> Edition by R.C. Hibbeler, ISBN: 013464929X <b><u>Pearson MasteringEngineering</u></b> The purchase for access to this MasteringEngineering homework can also be made in combination with the textbook. (Available at UTEP Bookstore)
Instructor:	Wen-Whai Li, Ph.D., P.E. Professor Department of Civil Engineering Office: A211 Phone: 747-8755 (office) E-mail: wli@utep.edu Office Hours: 1:30 pm - 2:30 pm, MW
Prerequisite:	CE 2334: Mechanics of Materials CE 2338: Dynamics

**Course Objectives**

At the end of the course, students will learn the following:

1. Understand the concept of fluid systems and control volume
2. Understand the concepts of temperature, pressure, and energy;
3. Apply conservation of mass and energy;
4. Solve fluid static problems;
5. Apply the Bernoulli and energy equations;
6. Apply the linear momentum equation;
7. Formalize a dimensional analysis for understanding the behavior of fluid; and
8. Apply the knowledge to analyze flow through closed conduits, open channel flow, pump and turbines

**Topics covered**

1. Fundamental Concepts in Fluid Mechanics
2. Fluid Statics
3. Conservation of Mass
4. Kinematics of Fluid Motion
5. Work and Energy of Moving Fluids
6. Fluid Momentum
7. Dimensional Analysis and Similitude
8. Analysis and Design for Pipe Flow

9. Flow through Closed-Conduit
10. Pumps and Turbines

### Approved Calculators (Scientific Calculators)

- **Casio:** All **fx-115** models. Any Casio calculator must contain fx-115 in its model name.
- **Hewlett-Packard:** The **HP33s** and **HP 35s** models, but no others
- **Texas Instruments:** All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either **TI-30X** or **TI-36X** in its model name.

### Grades

Your grade for this course will be assessed based on your performance in the quizzes (20 %), mid-term exams (60 %), and homework (20 %). Several quizzes will be given throughout the semester. The content of a quiz could be the materials covered in previous sessions or to be covered that day. There will be no make-up quizzes. Your worst quiz will not be counted for your grade. Four exams will be given during the semester. Make-up exams will be given only for extremely credible reasons. Every student is required to take the exams. Every exam will be counted towards your final grade.

Your final grade will be calculated based on the points you have accumulated as follows:

<b>A</b>	≥85
<b>B</b>	≥75 but <85
<b>C</b>	≥65 but <75
<b>D</b>	≥50 but <65
<b>F</b>	<50

The instructor reserves the right to revise this grading plan. However, students will be informed of any changes during the semester.

### Homework

Students are encouraged to solve as many problems in the book as possible. Students need to complete the assigned homework problems **online** before the due date. All problems are pre-assigned at the end of this syllabus. Late homework assignment submissions will receive a deduction of 5% per day after due date, but never lower than 60% credit.

Start a problem with one new sheet and write down all procedures and calculations before entering the answer online. Neatness is essential. Give necessary details in the solution for easy checking of calculational errors or other possible mistakes. You will be given an unlimited number of opportunities to enter the correct answer online. Use the hints provided in the MasteringEngineering website for the problems. Discuss the problems with your classmates, the teaching assistant, or the instructor, but do not copy answers from each other. You will do well in the class if you understand thoroughly all the problems you solved.

<http://www.pearsonmylabandmastering.com/northamerica/masteringengineering/>

Course ID: *li01285*

### Course Portfolio

Students are strongly advised to prepare a course portfolio documenting all materials relevant to the course. The portfolio shall contain the classnotes, quizzes, exams, homework, study notes, and any relevant materials accumulated during the semester. The instructor believes the students will benefit from the portfolio years later when they need to review the learned subjects for advanced courses or

professional engineer licensure exam.

### **Attendance and Tardiness**

Attendance is mandatory. Absence can be checked by the instructor through exams, roll calling, randomly picked names for problem solving in class, or other mechanisms. **You could receive an F grade if you miss more than three classes without the instructor's consent.** The instructor appreciates all efforts to attend the class. Part of being a professional is being on time and being prepared to do your job. This applies to your career as a student as much as it does to your future career as an engineer. Coming to class late is unprofessional and is very disruptive to the class. It interferes with the instructor's presentation, but more important, it interferes with the other students' concentration. You are expected to be in class and prepared to participate when the class bell rings. If you are late to class, you are to come in quietly and take an available seat near you. There will be no penalty for being late. You are always welcome to attend the class. However, all exams and quizzes will be given at the beginning of the classes. No additional time will be allowed for late attendees.

### **Study Aids**

#### **Instructor's Office Hour**

You are always welcomed to visit the instructors at the posted hours or by making an appointment.

#### **Teaching Assistant**

There will be a teaching assistant (TA) assigned to each session of the course. The TA will assist the instructor in grading quizzes, proctoring exams, and answering questions. In addition to the instructor's office hour, there will be TA's office hours to answer your questions. The TA's schedule will be announced in the second week of the class.

#### **ACES and the Tutoring Center**

Students are reminded of the tutoring services available in the ACES and the library. These services are provided to you by the University. Check the schedules and make use of the services.

### **Study Guide**

Read the text to be discussed prior to the scheduled class and review the subject thoroughly after the class. Read the textbook carefully. Work on all examples given in the text and solve as many unassigned problems as you can. Expect to spend 8 to 10 hours each week on the subject. Establish a good studying habit and you will do very well in the class. Use the tutorial materials available in the MasteringEngineering before and after the class.

### **Policy on Cheating**

Students are expected to be above reproach in all scholastic activities. Students who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the university. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts. (Regents: Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22). Scholastic dishonesty harms the individual, all students, and the integrity of the university; policies on scholastic dishonesty will be strictly enforced. ***Student having any mobile communication device out during exam or quiz will be considered to be engaged in academic dishonesty.***

**If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the**

CASS website at [www.sa.utep.edu/cass](http://www.sa.utep.edu/cass).

### References

Students are encouraged to study materials related to the subjects discussed in the class. There are many books that can help students to improve their understanding of the subjects and their problem solving skills. A vast amount of textbooks for similar topics are available at the UTEP library. For example, here are two good supplemental text books:

- Finnemore & Franzini, Fluid Mechanics with Engineering Applications, Tenth Edition, McGraw Hill
- Cengel, Cimbala, & Turner, Fundamentals of Thermal-Fluid Sciences, Fourth Edition, McGraw Hill

### Internet Learning

One of the web sites the students may want to visit is <http://cw.prenhall.com/hibbeler/>. There are many exercise (multiple-choice and true-or-false) problems designed to help the students. Additional websites will be available to the students. These websites will be announced during the course of the class.

## Class Schedule

Week	Date	Ch	Sections	HW #	Assigned Problems	Homework Due Date	
1	8/22 8/24	1	1.1-1.10 2.1-2.5	1 2	<i>Assigned in MasteringEngineering</i>		
2	8/29 8/31	2	2.1-2.12	2		HW 1	
3	9/5 9/7	3	3.1-3.5	3	(Labor Day, No Class)	HW 2	
4	9/12 9/14	3 4	3.1-3.5 4.1-4.4	4		HW 3	
5	9/19 9/21		4.1-4.4		Exam 1 (Chapters 1-3)		
6	9/26 9/28	5 6	5.1-5.5	5		HW 4	
7	10/3 10/5	6	5.1-5.5				
8	10/10 10/12		6.1-6.5	6		HW 5	
9	10/17 10/19	7	8.1-8.5		Exam 2 (Chapters 4-6)		
10	10/24 10/26		8.1-8.5	7 (Chap. 8)		HW 6	
11	10/31 11/2	8	9.1, 9.3 9.5-9.8	8 (Chap. 9)		HW 7	
12	11/7 11/9	9	9.5-9.8		Exam 3 (Chapters 8-9.3)	HW 8	
13	11/14 11/16	10	10.1-10.5	9 (Chap. 10)			
14	11/21 11/23	13	11.1-11.2 11.4-11.6	10 (Chap. 11)		HW 9	
15	11/28 11/30	14	12.1-12.3			HW 10	
16	12/7	Exam 4: Wednesday, December 7, 2022, 1:30 pm-3:45 pm (Tentative)					

**The above schedule, policies, and assignments in this course are subject to change in the event of extenuating circumstances or by mutual agreement between the instructor and the students.**