Soochow University

CEN 215 Fluid Mechanics
Summer 2024

Course Credits: 4
Contact Hours: 55 hours
Instructor: TBA
Email: TBA

COURSE OBJECTIVES

This course provides an introduction to the fundamental principles of fluid mechanics, guiding students from theory to application. Topics covered fluid statics, fluid kinematics, conservation laws for mass, momentum, energy, viscous flows, boundary layer theory, and potential flow theory and basic concepts of dimensional analysis and similitude, and practical applications of fluid mechanics. Furthermore, it emphasizes critical thinking, problem solving, estimation, and other vital engineering skills.

Upon Completion of this Course, students will be able to:

1. Understand the basic principles of fluid mechanics and apply them to solve fluid flow problems

2. Analyze and predict the behavior of fluid flows under different conditions

3. Apply the principles of fluid mechanics to practical problems in engineering and science

4. Interpret and analyze experimental data related to fluid mechanics

5. Explain the role of fluids in real life situations

PREREQUISITES

MAT 120 Calculus II
PHY 113 Introduction to Physics II

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
Lab Reports	20 Points
Midterm 1	15 Points
Midterm 2	15 Points
Quizzes	20 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

A ≥ 90 > B ≥ 80 > C ≥ 70 > D ≥ 60 > F.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

Donald F. Elger; Barbara A. LeBret; Clayton T. Crowe; John A. Roberson, *Engineering Fluid Mechanics*, 12th Edition, Wiley, 2019.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	**Topics:** Topic 1: Engineering Fluid Mechanics Topic 2: Fluid Properties Topic 3: System, State, and Property Topic 4: Fluid Statics **Assessments:** Quiz#1

Module 2	**Topics:** Topic 5: The Bernoulli Equation and Pressure Variation Topic 6: The Bernoulli Equation Topic 7: The Control Volume Approach and The Continuity Equation Topic 8: The Momentum Equation **Assessments:** Quiz#2 Lab Report#1
Module 3	**Topics:** Topic 9: Applying the Momentum Equation to Moving Topic 10: The Energy Equation Topic 11: Contrasting Bernoulli Equation to Energy Equation Topic 12: Dimensional Analysis and Similitude **Assessments:** Midterm#1 Quiz#3
Module 4	**Topics:** Topic 13: Viscous Flow Over a Flat Surface Topic 14: Flow in Conduits Topic 15: Drag and Lift Topic 16: Compressible Flow **Assessments:** Midterm#2 Lab Report#2
Module 5	**Topics:** Topic 17: Flow Measurements Topic 18: Turbomachinery Topic 19: Flow in Open Channels Topic 20: Modeling of Fluid Dynamics Problems **Assessments:** Quiz#4 Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow

University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

LEARNING REQUIREMENTS

1) Late assignments are not acceptable and are subjected to grade deductions.

2) Assignments submitted in the wrong format will be counted as not submitted.

3) Failure to submit or fulfill any required course component results in failure of the class.

4) Make-up for midterm and final exams only with valid excuses, as defined by the University.

5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACEDEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.