

CEE 310: Fluid Mechanics – Fall 2017

Lecture: Tuesday/Thursday 11:00-11:50am. Engineering Hall 1610
Labs: T 1:20-3:15; W 3:30-5:25; Th 1:20-3:15; F 9:55-11:50am & 1:00-2:55pm. EH 1269

Course Webpage: <https://learnuw.wisc.edu/>

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| Instructor: | Dr. Paul Block | paul.block@wisc.edu |
| Teaching Assistants: | Eric Mortensen (301, 303) | emortensen3@wisc.edu |
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Office Hours: Sunday 3:00-5:00pm; Monday 2:00-6:00pm, 1269 EH

Course Learning Objectives:

- Properties of water and how their changes affect the behavior of the medium
- Principles of hydrostatics, including forces on planes and manometry
- Characteristics and differences between laminar and turbulent flow
- Principles of conservation of mass and resulting continuity relationships
- Principle of conservation of momentum and impulse-momentum applications
- Ideal (frictionless) Bernoulli and Euler equations
- Energy and hydraulic grade lines
- Principles of Work-Energy equation
- Relationship of friction, turbulence and head loss in real fluids, pipe flow
- Open channel flow

Expected Student Outcomes:

The expected student outcomes for the Civil Engineering and Geological Engineering degree programs are as follows:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- (l) an ability to explain basic concepts in management, business, public policy, and leadership
- (m) an ability to explain the importance of professional licensure
- (n) an ability to understand common failure mechanisms of a component, process, or system and their causes and prevention

This course contributes to the attainment of outcomes a, b, e, j, k, and n.

Text: "Fluid Mechanics" by Hibbeler (Pearson); MasteringEngineering (Pearson)

Evaluation:

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|--------------|-----|---------|-----|-----------|-----------|
| Homework: | 15% | Exam 1: | 20% | A: 92-100 | AB: 88-92 |
| Lab Reports: | 15% | Exam 2: | 20% | B: 82-88 | BC: 78-82 |
| Quizzes: | 10% | Exam 3: | 20% | C: 70-78 | D: 60-69 |
| | | | | F: < 60 | |

Homework:

All homework assignments will be completed online through the MasteringEngineering website. You must purchase an account to access the website and complete your homework. Typically, you will have one week to complete each assignment and online submission will close after the due date and time. There are many learning resources available through MasteringEngineering and you will have numerous tries to answer each question, if needed. Think through and understand each concept from a fundamental level to prepare for the exams. TA office hours will be available. You may confer with others, however your submission should be uniquely yours. Occasionally, hardcopy problems may be assigned.

Lab Reports:

Handouts will be provided in lab (and also posted on the course webpage.) Lab reports must be completed and returned in lab by the due date. All experimental work should be completed during your lab session, however you may complete additional calculations, etc. on your own time. Two formal lab submissions will be required.

Quizzes:

Quizzes will be given at the start of most lab sessions, typically consisting of 3-4 problems. Questions will be based on a lab video you must watch prior to attending lab (links online) and the prior week's homework assignment.

Exams:

Exams will be held during special evening sessions, open book (hardcopy of Fluids text only), open notes.

Academic Policies:

Class Attendance:

You are expected to attend all lectures and lab sessions. In the event that you will be absent, please email the TA or me *in advance* as a courtesy. You will also be responsible for obtaining notes, etc. from a classmate.

Non-discriminating Environment:

The UW-Madison is committed to creating a dynamic, diverse, and welcoming learning environment for all students and has a non-discrimination policy that reflects this philosophy. Disrespectful behavior or comments addressed toward any group or individual, regardless of race/ethnicity, sexuality, gender, religion, ability, or any other difference is deemed unacceptable in this class, and will be addressed by the professor.

Diversity Statement:

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background,

experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background - people who as students, faculty, and staff serve Wisconsin and the world.

Academic Integrity:

As a UW-Madison student, you have the right to expect that you and other students will be graded fairly. You also have an obligation to conduct your academic work with honesty and integrity according to University standards. Academic honesty requires that the coursework you present to the professor honestly and accurately represent your own academic efforts. Work submitted under a student's name must be solely the work of that student and be carried out as prescribed by the professor. Additional information from the

Dean of Students is available online: <http://students.wisc.edu/doso/acadintegrity.html>

Students with Disabilities:

If you require accommodations for a physical or learning disability, please see me or the TA. The McBurney Disability Resource Center (<http://www.mcburney.wisc.edu>) is available for consultation, diagnosis, and assistance.

The instructor reserves the right to modify this syllabus as circumstances warrant.