UNIVERSITY OF WISCONSIN
INDEPENDENT LEARNING
877-895-3276 | il@uwex.wisconsin.edu | il.wisconsin.edu

U901-218: Fluid Mechanics

Course Format: Online

Course Author/s: Jian Zhang, Ph.D.

Course credits: 3

Prerequisites: Physics II, Mechanics II, Ordinary Differential Equations

Course Level: Intermediate

Course Description: This is an introductory course in fluid mechanics. The topics include fluid properties, fluid statics, fluid dynamics; potential flow; dimensional analysis; internal flow and external flow; and boundary-layer theory.

Required Course Materials

- *Fluid Mechanics, by Frank White, 9th edition*, published by McGraw Hill, ISBN: 9781260258318

Hardware Requirements

You will need a webcam, speakers, and a microphone. You will complete your exams through an online proctor, requiring all three components.

You will also be required to submit handwritten exam answers as a PDF. You will need access to a scanner or a smartphone to do this.

Course Learning Objectives

- Use the fundamental concepts of velocity field, stress field, and viscosity
- Apply the basic equations of fluid statics to manometers and hydraulic systems
- Determine the hydraulic force on submerged surfaces
- Apply the basic equations in integral form for a control volume
- Apply the differential analysis of fluid motion
- Apply the dimensional analysis and similitude
- Be able to solve the internal and external incompressible viscous flow problem

Course Overview

No.	MODULE/UNIT TOPIC	EVALUATED ACTIVITIES
1	Introduction	Conceptual Quiz, Calculating problems, and Inquiry discussion
2	Pressure Distribution in a Fluid	Conceptual Quiz, Calculating problems, and Inquiry discussion
3	Integral Relations for a Control Volume	Conceptual Quiz, Calculating problems, and Inquiry discussion
4	Differential Relations for Fluid Flow	Conceptual Quiz and Calculating problems
5	Dimensional Analysis and Similarity	Conceptual Quiz, Calculating problems, and Inquiry discussion
6	Viscous Flow in Ducts	Conceptual Quiz, Calculating problems, and Inquiry discussion
7	Flow Past Immersed Bodies	Conceptual Quiz, Calculating problems, and Inquiry discussion

Evaluation Methods
Your final grade will be based on your performance on the following:

1) Calculating problems in each module (25%).
2) Conceptual quiz in each module (14%)
3) Mid-Course Exam (28%)
4) Final Exam (30%)
5) Inquiry discussion (3%)

Calculating problems (25%)
Calculating problems are assigned in each module of this course and will cumulatively account for 25% of your final course grade. Some requirements:

- Calculating problems must be done on engineering paper or blank white computer paper.
- Calculating problems must be formatted in the following manner:
    - GIVEN: Start with a given statement where the pertinent problem information is stated, and any appropriate drawings and schematics are shown.
    - FIND: State the information for which you are asked to solve.
    - SOLUTION: Solve the problem. Show all your work and BOX in your final answer. **Be sure to include your units throughout the solution and in the final answer.** Make sure that your work is neat and organized.
    - Begin each problem on a separate page. You may use more than one page per problem, but you may not work on two problems on the same page.
- All problems must be attempted. Not all problems in each set will be graded for accuracy. The problems graded for accuracy will be worth more than those graded for completion. The number of problems graded for accuracy will vary for each homework set.
- Scan your solution pages as a single pdf file and then submit the pdf file on Canvas.

Conceptual quizzes 14%
Conceptual quizzes will be online and will cover material from the module learning resources. Conceptual Quizzes account for 15% of your final grade.

Inquiry discussion 3%
Each module (except Module 4) has one or two inquiry discussion questions which account for 3%. Students post their answers and are evaluated based on making an authentic attempt to answer the question using content from the module.

Exam Method: Online with Proctoring
This course requires all students to complete exams online with a proctoring service. Students receive one attempt on each exam.

Grading Scale
The following grading scale is used to evaluate all course requirements and determine your final grade:

A = 93–100	B = 83–87.9	C = 70–77.9	D = 60–69.9
AB = 88–92.9	BC = 78–82.9		F = Below 60

Pass/Fail Option
Students who enroll in an Independent Learning (IL) course under the pass/fail option will receive a final grade of S in place of a final grade equivalent to an A, AB, B, BC, or C and a final grade of U in place of a final grade equivalent to a D or F.