Syllabus

ME 0075 – Introduction to Fluid Mechanics

Spring Semester 2024

Lecture Time:	Wed. 08:50 – 11:00	**Classroom:**	4-203
Instructor:	Dr. John Pien	**Office:**	SCUPI Bldg. 503
Office Hours:	Mon. 14:45 – 15:30 Tue. 11:10 – 11:55 Wed. 11:00 – 12:00	**Email:**	john.pien@scupi.cn

Catalog Description

This 3-credit course is an introduction into the study of fluid statics and dynamics to provide an understanding of the basic concepts that relate to fluid mechanics and fluid systems. Topics covered will include hydrostatics, flow kinematics, control volume analysis, Navier-Stokes equations, inviscid flow and incompressible viscous flow. Prerequisites: *PHYS 0174, ENGR 0145, MATH 0290*.

Textbook

Pritchard and Mitchell, *Fox and McDonald's Introduction to Fluid Mechanics*, 9th Edition, Wiley.

Course Objectives

- Develop an understanding for fluids at rest and apply them to engineering applications.
- Apply the conservation of momentum to fluids in motion.
- Apply the conservation of energy for fluids in motion.
- Define and describe Reynold's number and how to calculate it.
- Apply differential equation solutions to fluid in motion applications.
- Define and understand laminar and turbulent flow conditions and how to apply relation to solve engineering applications.

Applicable ABET Outcomes

- An ability to apply knowledge of mathematics, science and engineering
- An ability to analyze and interpret data
- An ability to identify, formulate and solve engineering problems
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Course Outline

- Introduction (Ch. 1)
- Fundamental Concepts (Ch. 2)

- Fluid Statics (Ch. 3)
- Basic Equations in Integral Form for a Control Volume (Ch. 4)
- Introduction to Differential Analysis of Fluid Motion (Ch. 5)
- Incompressible Inviscid Flow (Ch. 6)
- Dimensional Analysis and Similitude (Ch. 7)
- Internal Incompressible Viscous Flow (Ch. 8)

Course Grading

Homework	15%
Quiz/Attendance	15%
Midterm Exam I	20%
Midterm Exam II	20%
Final Exam	30%

Exam Schedule

Midterm Exam I	Apr. 10th
Midterm Exam II	May 22nd
Final Exam	Jun. 19th

Late Assignment Policy

20% deduction/day.

Evaluation Policy

Partial credit will be awarded to recognize that some portion of the work is correct. However, partial credit grading is only practical if the work is clearly developed, with clear and well-marked diagrams when fitting, with the appropriate equations prominently displayed, where the substitutions into the equations are quite clear, and the assumptions used are obvious to the grader. That is, it is the student's responsibility to present her/his work so clearly that the grader can quickly ascertain the location and nature of the error(s) and can follow the subsequent work through. If this is not clear on the work submitted, credit cannot be given (then or later). **Partial credit is assigned at the discretion of the grader**. It is therefore always in your best interest to practice clarity and completeness in your solutions when working homework problems. This is applicable to exam problems as well.

Copyrights

Academic Integrity

All students are expected to adhere to the standards of academic honesty. Any student engaged in cheating, plagiarism, or other acts of academic dishonesty would be subject to disciplinary action. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include but is not limited to the confiscation of the examination of any individual suspected of violating the University Policy.