

## Syllabus

### **ME 0075 – Introduction to Fluid Mechanics** Spring Semester 2023

**Lecture Time:** Wed. 13:50 – 16:25

**Instructor:** Dr. John Pien

**Classroom:** 4-202

**Office:** 4-223

**Office Hours:** Wed. 09:30 – 12:00; 13:00 – 13:30

**Email:** john.pien@scupi.cn

**Teaching Assistant:** Litao Liu **Email:** 2019141520065@stu.scu.edu.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. Prerequisite: *PHYS 0174, ENGR 0145, MATH 0290*.

#### **Textbook:**

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

#### **Course Outcomes:**

- 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.

#### **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	10%
Midterm Exam I	20%
Midterm Exam II	25%
Final Exam	30%

### **Exam Schedule**

Midterm Exam I	April 12 <sup>th</sup> (week 8)
Midterm Exam II	May 17 <sup>th</sup> (week 13)
Final Exam	June 21 <sup>st</sup> (week 18)