ME 303: Fluid Mechanics
Lecture: MW 10 AM - 12 PM PHO 202
Discussion Section: F 12 – 1 PM PHO 202

Instructor: Dr. Tyrone M. Porter
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Office Hours: T 6-7 pm, F 4-5 pm, or by appointment
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Required Textbook/Coursewebsite:
Munson, Young, Okiishi, Heubsch. *Fundamentals of Fluid Mechanics*, John Wiley and Sons, Inc., 6th ed.
WileyPlus *Fundamentals of Fluid Mechanics*,
http://edugen.wiley.com/edugen/class/cls204683/

Supplemental Textbook
Cenegal, Cimbala. *Fluid Mechanics: Fundamentals and Applications*, McGraw Hill, 2nd ed.

Course Learning Objectives:

- Develop the ability to describe a fluid qualitatively and quantitatively
- Develop the ability to analyze a fluid under static and kinetic conditions
- Develop insight into how fluids flow close to and far from boundaries
- Gain an appreciation for the value of using experimental methods to measure fluid properties and characterizing fluid flow/behavior through dimensional analysis and lab-based experiments
- Gain experience in writing technical reports on lab-based experiments
- Gain insight into the application of fluid mechanics to practical problems in a variety of disciplines, including aerospace, mechanical, and biomedical engineering

Grading:

Assignments and Quizzes:	20% (quiz given weekly)
Laboratories:	30%
Exams (3):	25% per exam (Midterm and Final)

Assignments:
Problems will be assigned and solutions made available on the WileyPlus Coursesite. The problems and lectures will serve as the basis for quizzes to be given the week after the problems are assigned.

Schedule of lab sessions
Dates for lab sessions will be announced on WileyPlus.

Lecture by topic

This plan is subject to changes, but approximately, we will cover the following subjects by lecture:

1. Fundamental definitions
2. Fluid statics
3. Fluid statics (cont.)
4. Bernoulli equation
5. Bernoulli equation (cont.), Fluid kinematics
6. Fluid kinematics
7. Conservation of mass
9. Conservation of momentum
9. Fluids and thermodynamics
10. Differential analysis of fluids
11. Navier-Stokes equations
12. Navier-Stokes equations (cont.), viscous flow
13. Viscous flow
14. Dimensional analysis
15. Buckingham Pi therem
16. Dimensionless groups
17. Experiments and modeling
18. Similitude
19. Laminar pipe flow
20. Turbulent pipe flow
21. Pipe systems
22. Flow over bodies
23. Boundary layers
24. Drag and lift