Course Description
ME 331: Fluid Mechanics

Instructor:

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Catalog Data:

ME 331 – *Fluid Mechanics*: (3-0) 3 Credits

Prerequisites:

ME 211 and ME 221 and other sophomore and junior level physics and mechanics courses taken in sequence in the ME curriculum.

Textbook:

Fluid Mechanics, Fundamentals and Applications" by Cengel and Cimbala,
ISBN 978-0-07-352926-4

Purpose:

A study of the nature of fluids, constitutive relations, fluid statics/buoyancy, and the equations governing the motion of ideal (inviscid), viscous, and incompressible fluids. Internal and external flows, including viscous pipe flow, the Moody diagram, lift, drag and separation. Laminar and turbulent boundary layer theory, dimensional analysis, modeling, and similitude along with an introduction to computational fluid dynamics.

Topics:

The course will cover the traditional elements of in two units.

Unit 1

Objectives for Unit # 1 are:

- To understand the general engineering science-based problem-solving method applied to fluid mechanics,
- To understand and apply basic concepts, units and dimensions, concepts related to fluid properties and hydrostatic forces,
- To understand the interrelationships between systems and control volumes,
- To correctly apply and understand the limitations of Bernoulli's equation,

- To apply the integral forms of the mass, momentum, and energy equations to the solution of fluid mechanics problems,
- To apply the concepts of dimensional analysis and similitude.

Unit 2

Objectives for Unit # 2 are:

- To understand the basics of differential analysis and its application to the solution of fluid mechanics problems,
- To have a firm understanding of the approach required to obtain numerical solutions to fluid mechanics problems and an introductory facility in the use of the Gambit/Fluent CFD packages,
- To solve fundamental problems of viscous flow in pipes,
- To solve fundamental problems of viscous flow over submerged bodies.

Computer Usage:

Students will be expected to program in Excel. Students will have access to FLUENT and workstations to run the code.

Course Outcomes:

Upon completion of this course, students will have demonstrated the ability to:

- Apply skills in engineering, science, and mathematics related to fluid mechanics,
- Practice effective fluid mechanics analysis,
- Conduct data analyses and analyses verification.

Course Grade:

The grade earned by the student will be based upon the following (tentative) percentages:

In-Class Examinations	50%
Final Examination	30%
Homework, Class Participation	10%
Special Assignments	10%
Total	100%

The instructor reserves the right to modify percentages during the course.

Students with special needs or requiring special accommodations should contact the instructor, and/or the campus ADA coordinator, Jolie McCoy, at 394-1924 at the earliest opportunity.

Freedom in learning. Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any course of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should contact the dean of the college which offers the class to initiate a review of the evaluation.