Syllabus

MAE 3130: FLUID MECHANICS
Spring 2007

University of Colorado at Colorado Springs
Mechanical and Aerospace Engineering

Meets: MW 4:30-5:45 ENGR 109

Instructor: Dr. Jason Roney
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Course Objectives:

1. Understand standard fluid mechanics terminology such as inviscid/viscous, steady /unsteady, laminar/turbulent, etc. and its implications to fluid analysis.

2. Determine when to use fluid equations like the Bernoulli Equation, the Euler Equation, and the Navier-Stokes Equations for analyzing a particular fluid problem.

3. Apply control volume analysis appropriately to get "quick" results to a fluid problem.

4. Apply fluid mechanics concepts learned for physical modeling, experimentation, and estimating pipe flow characteristics.

5. In observing a physical fluid flow, state the relevant fluid concepts pertinent to the flow.

Textbook: Cengel, Y.A., Cimbala, J.M., Fluid Mechanics: Fundamentals and Applications, 1rst edition, McGraw Hill Higher Education, 2006.

Important Dates:
Midterm I: Tentatively Wednesday, February 21, 2007 (Class Period)
Midterm II: Tentatively Wednesday, April 4th , 2007 (Class Period)
Final: Wednesday, May 9th, 2007 4:30-7:00 p.m.
First Day of Class: Wednesday, January 17th, 2007
Last Day of Class: Monday, May 7th, 2007
No Class: Spring Break Week, March 26th and 28th

Grading:
Homework/Quizzes*: 15%
Projects*: 10%
Midterm I: 20%
Midterm II: 20%
Final (Comprehensive): 35%

*Homework will be due at the beginning of class on the due date and must be in the format in the hand-out. Late policy: 50% off, one day late, and will not be accepted 2 days late. Homework will be assigned in class and then posted on the website.

*Quizzes may be given periodically during the semester as deemed appropriate by the instructor—they will typically count the same as a single homework assignment. If the attendance in class is poor the instructor is not above giving an unannounced "pop" quiz. These quizzes may also result if participation in class room discussions are stalled or lacking.

*****There will be approximately two to three short projects used to demonstrate fundamental concepts.

Course Outline:

A solid overview of Chapters 1-11 from Cengel and Cimbala et al., 2006 in addition to two additional units which will be covered with supplemental materials. Students are responsible for the material in the chapter listed below as well as that material presented in class.

	Chapters
1. Fundamental Concepts	1.1 – 1.10, 2.1-2.7
2. Fluid Statics	3.1 – 3.8
3. Fluid Kinematics	4.1-4.3
5. The Bernoulli Equation/Mass Conservation and Energy	5.1-5.6
5. Momentum Analysis with a Control Volume	6.1-6.4
6. Similitude/Dimensional Analysis	7.1-7.4
7. Pipe Flow/Internal Flows	8.1 – 8.7
8. Differential Analysis/Navier-Stokes Equations	9.1-9.6
9. Navier-Stokes Simplified to Approximate Solutions	Chapter 10
10. Flow Over Bodies: Lift and Drag/External Flows	11.1 – 11.7
11. Fluids Measurements	Project Coverage
12. Computational Fluid Dynamics	Project Coverage

Course Outline Subject to Appending as the Quarter Progresses.