

UNIVERSITY OF NOTRE DAME
Department of Aerospace and Mechanical Engineering

AME 60635: Intermediate Fluid Mechanics
Fall Semester 2007

Professor Patrick F. Dunn

Room 107 Hessert Laboratory, 631-6089, pdunn@nd.edu, <http://www.nd.edu/~pdunn>

Course Time and Location: TR, 2:00 PM to 3:15 PM, 129 DeBartolo

Course Web Site: <http://www.nd.edu/~pdunn/www.ame538/ame538.html>

Course Text: *Fluid Mechanics* (3rd edition), P.K. Kundu and I.M. Cohen, Elsevier Academic Press, ISBN: 0-12-178253-0.

Course Reference Material: [1] "Lecture Notes on Intermediate Fluid Mechanics" by Joseph M. Powers, April 26, 2004 version (available via the course website), and [2] *Fluid Mechanics*, F.M. White, 1999, 4th Edition, McGraw-Hill (or any other good undergraduate fluid mechanics text).

Course Content: This course is intended for first-year graduate students who have had only a brief exposure to fluid mechanics in their undergraduate curriculum. The governing equations of fluid mechanics are developed in detail and then applied to a variety of flows. The topics that are covered include: [1] an overview of fluid mechanics, [2] a review of Cartesian tensors, [3] kinematics, [4] conservation laws, [5] laminar flow, [6] boundary layers, [7] waves, [8] vortex dynamics, [9] irrotational flow, [10] aerodynamics, and [11] compressible flow.

Course Grade: The final course grade will be based upon your performance in all aspects of the course. These include homework and class participation (30 %), mid-term examination (30 %), and final examination (40 %).

Homework: There will be 12 homework sets this semester, each with approximately 5-10 problems. They will be due at the *beginning* of class on most Thursdays. Late solutions will *not* be accepted. Solutions must be done on *one side* of 8.5 in. x 11 in. paper with no frayed edges. Multiple pages must be stapled together, with your name clearly printed on the top of the first page.

Exams: There will be one one-hour mid-term examination and one two-hour final examination. Both exams will be closed book and closed notes. A basic equation sheet and any necessary tables will be provided. This format is similar to that of the AME Fluids Qualifying Examination.

Assistance: Mr. David Schatzman (115 Hessert Lab, 631-4330, dschatzm@nd.edu) and Mr. Oleg Kim (B023 Hessert Lab, 631-8360, okim@nd.edu) are the teaching assistants

for this course. They are responsible for all aspects of the homework, including 'help-on-homework' assistance and grading. Mr. Schatzman will handle the odd-numbered assignments (1, 3, 5, 7, 9, and 11) and Mr. Kim the even-numbered assignments (2, 4, 6, 8, 10, and 12).

Attendance and Excuses: You are expected to attend and to engage yourself every class. Attendance will not be taken. In situations in which you cannot make lecture, it is *your* responsibility to get the class notes from a classmate. However, you **must** be present for all scheduled exams. You will be neither excused from nor granted any extension for an assignment unless you obtain an approved "Verification for Absence" by the University's Vice President for Residence Life. The University will mail a copy to me. Any 'unofficial' excuse will not be accepted.

Honesty: You are all expected to follow the Academic Honor Code of the University. Honesty in class is a moral issue that is impossible to strictly enforce. Copying (in part or whole) another's problem solution, computer program or written work (plagiarism), and cheating on exams are considered dishonest and absolutely will not be tolerated. This implies that **there should not be the exchange of solutions, etc., on homework and exams. Discussions of *approaches* to solutions can be held, but with the intent of *teaching one another as opposed to allowing your friend to copy a solution because he or she did not have the chance do their work. It is dishonest to use the work of another student even with his or her consent if you are being graded on an individual basis. When you write only your name on an assignment, it means ONLY you did the work.*** This includes the work of those students currently taking this class as well as those who took it previously and gave you their files. If you have any questions about my policies, it is *your* responsibility to ask me. Do not hesitate to do so!