

UNIVERSITY OF NOTRE DAME
Department of Aerospace and Mechanical Engineering

AME 20213 – Spring 2009
Fundamentals of Measurement and Data Analysis
Room 131 DBRT, Tuesday and Thursday, 9:30 AM – 10:45 AM

Prof. Patrick F. Dunn

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Course web site: <http://www.nd.edu/~pdunn/www.ame250/ame250.html>

Course Text: REQUIRED: Measurement and Data Analysis for Engineering and Science by Patrick F. Dunn, McGraw-Hill, ©2005, ISBN 0072825283.

Optional Text: A good reference book on MATLAB.

Course Content: This course introduces you to the fundamental techniques of measurements and data analysis. The main topics that will be covered include (1) An Introduction to Experiments, (2) Measurement Systems, (3) Probability and Statistics, (4) Uncertainty Analysis, and (5) Signal Characterization and Analysis.

Learning Goals: At the conclusion of this course, you should be able to:

- communicate through written work the purpose, method and results of an experiment,
- apply a proper “units” analysis to any engineering/science problem and be able to convert correctly between the metric and English systems of units,
- determine the appropriate measurement techniques for an experiment and the uncertainties associated with that experiment, and
- analyze data in either discrete or analog form using appropriate statistical methods and analysis tools to arrive at technically sound conclusions..

Course Grade: Your final course grade will be based upon your performance as follows:

Lab Exercise Tech Memos/Report (3 TMs @ 10 % and 1 TR @ 15 %)	45 %
Homework	10 %
Mid-Term Exam	20 %
Final Exam	<u>25 %</u>
	100 %

Homework: Homework is assigned and due almost every week. Your homework solutions are due typically on most Thursdays at the **beginning** (9:30 AM) of class. Late solutions will *not* be accepted. All homework assignments with due dates are posted on the course web site. Solutions must be legible, *stapled*, and *not* with torn edges (as when torn from spiral-bound notebooks). Any homework that does not comply with these standards will not be graded.

Laboratory Exercises and Conditions: There will be 4 laboratory exercises this

semester. Most will involve the scheduled lab times. You *must* read the laboratory exercise handout prior to coming to lab and be prepared to answer questions from the TA about the exercise. You are required to be *on time* for these exercises. There will be a 10 % penalty if you show up late and a 25 % penalty if you miss your scheduled lab time (you then *must* re-schedule with the TA). You *must* attend and complete all lab exercises to pass the course. You will work either by yourself or with one lab partner. An account will be taken of those who have had to work alone. Absolutely *no* sharing of data or material between groups is allowed unless specified for that exercise. Exercise results will be communicated either as a technical memo or as a technical report. There is a **late period penalty** for submission of written documents: up to 24 hours late (30 % off); thereafter until the beginning of the following class (50 % off); thereafter (0 %). Documents are due at the **beginning** of the class. All due dates are posted on the course web site.

Exams: A mid-term exam will be given that covers the lecture and laboratory material of the first half of the semester, and a final exam that covers the lecture and laboratory material of the *entire* semester. Each exam will consist of two parts, one, multiple choice and fill-in-the-blank (graded no partial credit), and, the other, problems like the homework (graded partial credit). Cell phones, PDAs, and the like are prohibited during exams.

Assistance: We will be available throughout the semester to answer questions. The graduate assistants assigned to this course are listed on the course web site. Do *not* assume anyone will be available if you just stop by his/her office, including me. Please call or email us ahead to set up a time. Work directly with the responsible graduate student for the specific laboratory exercise or homework. A regularly scheduled 'help session' will be held every week. The purpose of the session is to answer *your* questions on homework or laboratory exercises. This is **YOUR** time to ask questions and *not* our time to lecture on more material!

Course Policies: *Class Attendance and Excuses:* You are expected to attend and to be engaged in every class. Attendance will not be taken. I ask for your full, undivided, and focused attention during class. Distractions to me during lecture and other students in class to learn the lecture material will *not* be tolerated. Example distractions include working homework for another class, emailing, text-messaging, web browsing, reading other material, and carrying on conversations. If any distractions occur, you will be asked to leave the classroom. Please be considerate of others. 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 and labs. 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 of the excuse to me. Any 'unofficial' excuse will not be accepted.

Re-Grade Policy: There will be *no* re-grades of homework, examinations or lab exercise memos and reports *except* to correct a point-addition error. You are encouraged to discuss the reasons for any deficiencies in your memos and reports with the TA for that exercise. However, your point score will not be changed.

Honesty: You are all expected to follow the Academic Honor Code of the

University, which states **“As a member of the Notre Dame community, I will not participate in or tolerate academic dishonesty.”** 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, laboratory exercises, 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!