Course Information

Meeting time/location
TH 4:00-5:00 pm, GCB 207

Textbook
J. D. Anderson, *Aircraft Performance and Design*, McGraw-Hill, 1999

Reference texts
D. Randall, *Jane's Aircraft Recognition Guide*, HarperCollins Publishers, 1996.
J. D. Anderson, *Introduction to Flight*, 3rd Ed. McGraw-Hill, 1989.

Course topics
Lift/Drag (Chap 1&2)
Propulsion (Chap 3)
Forces, required thrust (Chap 4&5)
Velocities of interest, stall (Chap 5)
Steady performance parameters: rate of climb, glide ratio, rate of descent, ceilings, range, endurance (Chap 5)
Accelerated performance parameters: steady level turn, pull up, pull down, V-n diagram (Chap 6)
Take off/ landing (Chap 6)

Course Objectives

Primary:

-- Students will be able to analyze the basic performance parameters for a subsonic aircraft. (Homework assignments, exam, aircraft portfolio.)

Secondary:
-- Students will be able to present complete solutions to technical problems following an acceptable engineering format. (Homeworks, project reports.)
-- Students will learn to see equations as representations of physical phenomenon and learn how previous mathematics courses are useful when studying an engineering topic. (Quizzes, in class active learning projects.)
-- Students will begin to employ computer tools for obtaining and presenting solutions. (Homeworks requiring the use of Excel or MATLAB to produce graphs, "Aircraft portfolio", Web research for projects and homework.)

Computer usage

- Some homework will require the use of a plotting package such as MATLAB
- The aircraft portfolio will be completed using MATLAB
- Predictions of performance parameter using a computer will be required. Students will use an airfoil aerodynamic simulation tool as well as LinAir which is a three-dimensional wing aerodynamic simulation tool.

Projects

- "Airfoil portfolio:" You will select an aircraft (or be assigned an aircraft) to analyze. The portfolio will be created as an ongoing project during the term. As new performance metrics are introduced, you will calculate the capabilities of the aircraft you have chosen.
- "Aircraft project:" You will design and build a new wing for an existing model airframe and subsequently predict and measure the wing's lift/drag characteristics. You will also predict the composite aircraft's performance, measure its performance, and discuss your results. This will be completed in teams of 2. More information concerning this project will become available as the semester progresses.

Approximate Grade Weighting

25% -- Aircraft Portfolio
30% -- Aircraft Project
5% -- Homework(+possible quizzes)
20% -- Midterm
20% -- Final Examination

Remember: THE PROFESSOR DOES NOT GIVE GRADES, THE STUDENTS EARN A GRADE

General Information

Exams will be closed book and held in class. The final exam will be comprehensive. You can bring on 8.5" X 11" sheet written on one side with helpful formulae etc. to the first exam and two such sheets to the final exam.

Homework, which will be assigned in class and noted on the course web page is due at the beginning of the designated class period (unless otherwise noted.) All homework will be graded and returned. The top of the first page of the homework should have: your name and the course number. Every page should have the problem number on the top right corner. There should be no frayed edges and multiple pages must be stapled. You should briefly restate the problem (some even make a photo copy and tape the problem statement to the page). Give a sketch if helpful. List the basic assumptions. Give all necessary analysis. If asked to plot something, you must create a computer-generated graph with appropriate axis labels and legend. Place a box around the final answer. Correct units should accompany all numerical answers. **Any answer that is not of the correct order of magnitude, with no accompanying explanation, will be given no points, even if the method used to do the problem is correct.** Homework solutions will be on reserve in the SCI/ENG Library after the assignment is due.

Honest policy: Adherence to the Student Academic Code of Conduct is expected. I encourage you to freely discuss the homework amongst one another as you formulate your solutions individually. *Your* written work should represent *your* understanding of the problem. The "Aircraft Portfolio" calculations and "Other Assignments" must be done individually unless otherwise noted.

In practice this means that copying (in whole or in part) another student's homework, exam, computer program, or paper is not permitted. If you choose to discuss your work with a colleague, it should be a discussion in which one teaches another or both work to a mutual understanding. As a counter-example, it is not acceptable to give a friend your homework five minutes before class so that your friend can copy your work. I also consider it unacceptable to copy work from a student who was in the class a previous year. In your written reports, be careful to correctly use quotation marks for words that did not originate with you. Also, be sure to properly cite all sources you used. As is done in the scientific literature, you should *briefly* acknowledge in writing any significant discussion or interactions you had regarding the work you submit. As a general principle, I do not accept the justification that you were not sure of my intentions. If you feel you may be in an ethical gray area, then you should consult with me *before* acting.