

**ME 409: Flight Vehicle Design I
Information Sheet**

INSTRUCTOR: Prof. Don Wroblewski
OFFICE: ENG 415

OFFICE HRS: TTh 11-12 **
PHONE/E-MAIL: 3-9739/ dew11@bu.edu

** Note: If you need to talk with me outside of office hours, you have three options:

- (1) **Open door policy:** If my office door is open, you are welcome to drop in without an appointment. My door is rarely closed when I'm in my office, so when it is, it's usually because I'm in a private meeting or because I'm working on a tight deadline. Please respect my privacy during these times.
- (2) **E-mail:** I usually can answer it within ½ hour if I'm in my office.
- (3) **Blackboard Forums:** I have set up forums for questions—I will try to check these several times a day.
- (4) **Phone:** One way to get around a “closed door,” ... IF I decide to answer my phone ☺

TEXTBOOKS:

Required: *Aircraft Design: A Conceptual Approach*, Daniel Raymer, AIAA, 2006
Reference: *Design of Aircraft*, Thomas Corke, Prentice Hall, 2003
Airplane Design- Parts 1-8, Jan Roskam,

BLACKBOARD SITE:

BlackBoard (BB) will be used extensively for this class:

- (1) Course administrative details (e.g., syllabus): posted under the Course Information tab.*
 - (2) Requirements and formats for deliverables: posted under Assignments tab.*
 - (3) Lecture slides and other pre-lecture material: posted under Course Documents tab.
 - (4) Course Calendar
 - (5) Announcements and updates to assignments or due dates: posted on Announcements page. Please check this regularly—I would prefer to use this as a means of communication rather than flooding your Inbox with repeated e-mails.
 - (6) Group pages: found under Communications tab. Team members can communicate and share files, and submit electronic deliverables to me. I will also post feedback on deliverables to each team through their group page.
 - (7) Forums for lecture material (see below under Lecture heading)
 - (8) Links to relevant information: found under External Links tab.
- * For items (1) and (2): NO hard copies will be handed out in class

LECTURES:

Most class periods will NOT be devoted to traditional lectures. Instead, the following format will be used:

PRIOR TO CLASS

- I will post lecture slides that you will be expected to review BEFORE class. Each slide packet will end with a list of review questions; you should review these carefully.
- Each “lecture” will have an associated forum on the Blackboard (BB) site. You can post questions on material that you may not fully understand, and I will use this list to select material for review at the beginning of class. You can also post comments or links to relevant Websites.

IN CLASS “LECTURE”

- I will review areas of concern as revealed by the BB site and go over review questions.
- I may discuss other relevant information and examples.

IN CLASS ACTIVITIES

- You will work in groups on some activity related to the “lecture” material that will help you to better apply the concepts to your capstone project. As such, your attendance is important.

DISCUSSION: W 1-2 PM MCS B31 (111 Cummington)

Discussion will be used for several purposes:

1. Quizzes will be given during discussion (see syllabus for dates).
2. Team Meetings with DEW
3. Q&A for deliverables
4. Discussion of solutions for in-class design problems.
5. Teaming exercises

ASSIGNMENTS AND GRADING (SEE SYLLABUS FOR DUE DATES)

Individual assignments: (45% of grade)

These are done individually by each student. Each student receives his/her own grade.

1. Quizzes: (30%) Three one-hour quizzes, to be given during the discussion section. They will focus on concepts covered in pre-class review questions and analysis covered in class activities.
2. Oral Presentation: (5%) Based on oral presentation skills demonstrated during Design Review.
3. Class participation: (10%)

This consists of three components:

1. (8%) Participation in class AND in on-line forums through informal discussions, Q&A, and in-class activities.
2. (2%) Technical Society enrollment. To emphasize the importance of professional societies, all students are required to join a technical society: e.g., AIAA, ASME, SWE, SAE or SAME. (NOTE: Students can join ASME for free; AIAA cost \$20). You must submit some evidence of your membership; e.g., a receipt acknowledging your application or a membership card. Those who are opposed to joining a technical society can satisfy this requirement by submitting a 1,000 word essay describing AIAA, what it has to offer to students and professionals, its role in the Aerospace industry and a well-formulated argument as to why you are opposed to joining. The essay will be graded and the grade will be used to pro-rate the 2% component of the grade.

Team Assignments--Capstone Project: (55% of grade)

All team members receive the same grade. Specific requirements will be posted on CourseInfo

NOTE: All team assignments will be due on Fridays by 4 PM (See syllabus for dates).

- 1) Formal deliverables:
 - a) Project Proposal: Written report describing mission, proof of relevance, performance targets/constraints, and details of team. (5%)
 - b) Interim Report: Written report containing updates to mission and design constraints/targets, and summary of all design analysis up through engine selection (15 %)
 - c) System Design Review: Oral presentation describing the “frozen” configuration, including analysis, trade studies and drawings. No formal report is required, but an e-ppendix (spreadsheets, MATLAB scripts, etc) will be required to support analysis, and will be due prior to the presentations – see syllabus (25 %)

2) Project updates:

Details of analysis for various components of design. These will be electronic submissions, with no formal reports.

Project Update 1: (5%)

Project Update 2: (5%)

CAPSTONE DESIGN NOTEBOOK

For your capstone project, it is expected that each student will maintain a Design Notebook, which documents work on his/her aspect of the design, as well as group progress. Although this notebook will be more appropriate for your work in ME 410, you should begin to use it this semester. Early in the conceptual design phase, it is important that you document the decisions made regarding configuration alternatives. It is critical that you keep this notebook up to date. This may seem like an undue burden, but in the end it will save you an enormous amount of time when you need to prepare formal reports. **You should bring the notebooks to all meetings.**

• Type of Notebook

- The type of notebook is not critical, as long as it used regularly.
- Suggested type
 - Roaring Springs Composition Book 100 sheets
 - Green Cover
 - 5x5 Quad Ruled-- VSTYLE RR77255

• Guidelines for use

- 1) All entries must be in (inerasable) ink -- cross out with a single line any mistakes (may not be a mistake!).
- 2) Number each page, reserve the first few pages for a table of contents. You may keep a contact (telephone, email, etc) list at the back. The cover should indicate the project, sequential book number, your name, and period of use. Back reference can be made by book and page numbers.
- 3) Write something in your notebook every day that you work on the project. Get in the habit of dating and signing (initializing) each page. For particularly important pages have someone else witness by signing and dating the date they sign. This type of record is important for patent and invention disclosures.
- 4) Printed material may be taped into the logbook with the source noted and of course signed and dated, including computer analysis outputs.
- 5) The content should be a work in progress not a finished tome, almost like an engineering diary. Include the following: notes on group meetings and meetings with advisors; design thoughts; sketches or drawings; documentation of analysis, especially computer analysis including listing of programs/scripts, results, and graphs; documentation of requests for information, including requests to other team members; descriptions and results of independent inquiries-- library searches, internet searches, contact with outside experts/vendors.

ME 409 Flight Vehicle Design I, Fall 2010

SYLLABUS Version 1.1

8/19/10

Class	Day	Dates	Topic	Project Deliverables
1	Th	9/2	Introduction	
2	T	9/7	Mission design and requirements	
			Team meetings	
3	Th	9/9	Configuration and Design Features	
	M	9/13	<i>Formal Deliverable due by 4 pm</i>	<i>Team Project Proposal</i>
4	T	9/14	Thrust-to-weight and Wing Loading	
5	Th	9/16	Thrust-to-weight and Wing Loading	
6	T	9/21	Initial Sizing	
DIS	W	9/22	Quiz 1	
7	Th	9/23	Teaming skills	
8	T	9/28	Airfoil & wing design	
9	Th	9/30	Wing design	
	M	10/4	<i>Project update due by 4 PM</i>	<i>Project Update 1</i>
10	T	10/5	Fuselage Design	
11	Th	10/7	Tail Design	
	T	10/12	MONDAY SCHEDULE	
	W	10/13	Quiz 2	
12	Th	10/14	Writing skills	
13	T	10/19	Engine Selection- Jets	
14	Th	10/21	Engine Selection- Propeller	
	M	10/25	<i>Formal Deliverable due by 4 pm</i>	<i>Interim report</i>
15	T	10/26	High Lift Devices	
16	Th	10/28	Takeoff and Landing	
17	T	11/2	V-n diagram and gust loads	
	W	11/3	Quiz 3	
18	Th	11/4	Weights & refined sizing	
19	T	11/9	Static stability	
			Team meetings	
20	Th	11/11	Static stability	
	M	11/15	<i>Project update due by 4 PM</i>	<i>Project Update 2</i>
21	T	11/16	Cost	
22	Th	11/18	Structural Design	
23	T	11/23	Safety	
	Th	11/25	HOLIDAY NO LECTURE	
24	T	11/30	Presentation skills	
25	Th	12/2	TBA	
	F	12/3	<i>Eppendices due by 4 pm</i>	<i>System Design Review</i>
26	T	12/7	<i>Group Presentations</i>	<i>System Design Review</i>
27	Th	12/9	<i>Group Presentations</i>	<i>System Design Review</i>