ME 409: Flight Vehicle Design I:
Information Sheet

INSTRUCTOR: Prof. Don Wroblewski **OFFICE HRS:** M 4-5 Th 11-12 **
OFFICE: ENG 415/ **PHONE/E-MAIL:** 3-9739/ dew11@bu.edu

** 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.
2011 UPDATE: With my new responsibilities as Associate Dean, I will likely be out of my office more frequently than in previous years, so the best options may be those listed below.
(2) E-mail; I usually can answer it within ½ hour if I'm in my office. But, if you are asking a question that is relevant to all students in the class, I suggest posting it on Piazza.
(3) Piazza: See below for description of Piazza

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,
* Available on reserve in the Science and Engineering Library & in the Design Library

LECTURES:

This course is not your typical lecture-HW-test course. The format, described below, is based on published research and best practices for active learning techniques. Active learning involves more engagement from students prior to and during the class periods, but results in better retention of material.

PRIOR TO CLASS

- Review slides posted on Blackboard (BB), and make sure you are able to answer any of the pre-flight "review questions"
- For each class (i.e., set of posted slides) there will be a Piazza forum with several of the harder pre-flight review questions, though you can start a thread for any of the question related to the topic. Note that part of your grade will be based on participation in these threads.

IN CLASS "LECTURE"

- I will review overall concepts and introduce additional examples.

IN CLASS ACTIVITIES

- There may be several types of active learning exercises that engage you either in teams or individually. As such, your attendance is important. Some of these may involve interaction through Piazza, so bring your laptop or other web-accessible device.

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

Discussion will be used for several purposes:

1. Q&A for deliverables
2. Discussion of solutions for in-class design problems.
3. Additional content exercises/activities
4. Teaming exercises

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. You can use Google Docs or other similar resources instead of Blackboard, but note that I will post feedback on deliverables to each team through their Blackboard group page.
(7) Links to relevant information: found under External Links tab.

* For items (1) and (2): NO hard copies will be handed out in class

PIAZZA:

Piazza is a new Q&A forum application that is better than the one provided in Blackboard. This will be the main forum for online Q&A and discussions. Questions sent to me via e-mail will be posted on Piazza for all to see, so its better for you just to post them on Piazza.

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ASSIGNMENTS AND GRADING (SEE SYLLABUS FOR DUE DATES)

Individual assignments: (40% of grade): Each student receives his/her own grade.

1. Midterms: (28%) Two 2-hour exams. They will focus on concepts covered in pre-class review questions and analysis covered in class activities.
2. Oral Presentation: (6%) Based on oral presentation skills demonstrated during Design Review.
3. "Class" participation: (6%) Participation in class activities and exercises AND in on-line forums.

Team Assignments--Capstone Project: (60% of grade): All team members receive same grade.

1) Deliverables:

   a) *Project Proposal:* Written report describing mission, proof of relevance, performance targets/constraints, and details of team. (5%)

   b) *Project Update:* Electronic submission of analysis accompanied by informal report. (12%)

   c) *Interim Report:* Written report containing updates to mission and design constraints/targets, and summary of all design analysis up through engine selection (18 %)

   d) *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 %)

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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 2011

SYLLABUS Version 1

8/10/11

Class	Day	Dates	Topic	Project Deliverables
1	T	9/6	**Introduction**	
2	Th	9/8	**Mission design and requirements**	
3	T	9/13	**Configuration and Design Features**	
4	Th	9/15	**Thrust-to-weight and Wing Loading**	
	M	9/19	***Formal Deliverable due by 9 AM***	***Team Project Proposal***
5	T	9/20	**Thrust-to-weight and Wing Loading**	
6	Th	9/22	**Initial Sizing**	
7	T	9/27	**Airfoil & wing design**	
8	Th	9/29	**TEAMING SKILLS**	
	M	10/3	***Project update due by 9 AM***	***Project Update 1***
9	T	10/4	**Fuselage design**	
10	Th	10/6	**Tail Design**	
11	T	10/11	**Engine Selection- Prop**	
12	Th	10/13	**Engine Selection- Jet**	
13	T	10/18	**Midterm 1**	
14	Th	10/20	**Drag Build-up**	
15	T	10/25	**High Lift Devices**	
16	Th	10/27	**WRITING SKILLS**	
	M	10/31	***Formal Deliverable due by 9 AM***	***Interim report***
17	T	11/1	**Takeoff and Landing**	
18	Th	11/3	**V-n diagram and gust loads**	
19	T	11/8	**Weights & refined sizing**	
20	Th	11/10	**Static stability and trim 1**	
21	T	11/15	**Midterm 2**	
22	Th	11/17	**Static stability and trim 2**	
23	T	11/22	**Cost**	
	Th	11/24	**HOLDAY NO LECTURE**	
24	T	11/29	**PRESENTATION SKILLS**	
25	Th	12/1	**Safety**	
	M	12/5	***Eppendices due by 4 pm***	***System Design Review***
26	T	12/6	***Group Presentations***	***System Design Review***
27	Th	12/6	***Group Presentations***	***System Design Review***