ME 410 Flight Vehicle Design II Spring 2010
Information Sheet

INSTRUCTOR:	OFFICE:	OFFICE HRS:	PHONE	E-MAIL
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TEXT: Recommended:
Aircraft Design: A Conceptual Approach, Daniel Raymer, AIAA, Washington, D.C., 2005.

COURSE GOALS:

The main activity in this class will be a preliminary design of an aircraft, to be accomplished in teams. The idea is to have each member of the group be responsible for one functional aspect of the design. The success of your final design will depend upon how well each individual successfully performs his/her task as well as the ability to work together and communicate so that the separate pieces can be integrated into a viable design. To that end, the specific objectives of the course are as follows:

- To provide an in-depth aerospace *system* design experience within the context of a team effort.
- To stress the importance of professional skills such as communication and teaming.

PROJECT MILESTONE/DELIVERABLES:

See Syllabus for Due Dates; Additional Information to be provided

1. ***Machine Shop Orientation***: Introduction and orientation to machine shop, including description of machines, safety and other policies, and expectations for drawings. All group members must attend.

2. ***Conceptual Design Update***: Technical memorandum describing updates to conceptual design based on comments provided at the end of last semester. **E-ppendices**.

3. ***Work Plan:*** Short report outlining workplan, including Gantt chart and linear responsibility tables.

4. ***Mock-up Plan***: Written report describing mock-up, Gantt chart, and engineering drawings.

5. ***Preliminary Design Progress Report***: Formal presentation providing progress of preliminary design efforts. ALL members of the group are expected to present material and to evaluate the progress reports of the other groups. **E-ppendices**

6. ***Mock-up***: Mock-up.

7. ***Design Review Presentation***: Formal presentations scheduled for approximately two weeks before the final presentation to present final design. Unlike the Final Design Presentation, which is a short presentation to a general audience, the design review should be oriented towards a technical audience. ALL members of the group are expected to present material and to evaluate the progress reports of the other groups. **E-ppendices**.

8. ***Final Design Report***: Detailed written technical report, describing design and analyses each of the functional areas. This will be the primary archival record of your work. **E-ppendices.**

9. ***Final Design Presentation***: Oral presentation to a general technical audience (other AM students, Professors, alumnae and guests). In general, this is expected to be a well-polished display with effective visual graphics that demonstrate both a high-level of technical expertise and communication skills. ALL members of the group are expected to present material.

ME 410 Flight Vehicle Design II Spring 2010
Information Sheet

OTHER ASSIGNMENTS/TASKS:

1. ***Team Meetings:***
   - Weekly meetings with instructor to discuss progress and plans during the scheduled class period, typically on Thursdays, but on Tuesdays for selected weeks.
   - Meetings will be 25-minutes long, and are meant as a means to inform the instructor regarding project progress and to seek advice regarding major design issues. Detailed technical questions that require more than the allotted time should be handled during office hours.
   - **These are not intended to replace regular team meetings: i.e., do not plan to carry out regular team business such as making assignments for deliverables, voting on design issues etc.** However, if conflicts among various team members are significantly impeding progress, then this should be included as part of the meeting agenda.
   - For each meeting, a different team member will be designated as the *meeting leader* and another will be assigned as the *secretary*.
     - The responsibilities of the leader will include the following:
       - Preparing handout which includes an agenda, a summary of the group's activities since the last meeting, highlights of key findings, comparison of progress to the Gannt chart, outline of plans for the coming week, and a listing of any outstanding concerns or issues. This should be in the form of several PowerPoint slides.
       - Presenting a 5 minute summary of the items in the handout along with a clear statement of the key objectives of the meeting. This will be in the form of a formal oral report.
       - Chairing the meeting—i.e., making sure that the discussions stay on topic so that all agenda items can be addressed.
     - The responsibilities of the secretary will be to keep minutes of the meeting and to post those minutes to the Blackboard Group page.
   - All team members are expected to attend all meetings and to bring their notebooks to the meetings. Exceptions for attendance will be made on a case by case basis, but generally will be granted only for the same types of emergencies that would merit a make-up exam. Students who need to miss a meeting with a valid excuse must inform the instructor and the meeting leader at least two days in advance. Meeting leaders or meeting secretaries who need to miss meetings must inform the instructor at least one week in advance and must also designate an alternate meeting leader or secretary.
   - See syllabus and separate meeting schedule for time slots and meeting leader/secretary designation.
   - Although each team will be meeting for only 25 minutes, the rest of the class period is NOT free time; it should be used for project work or other ME 410 assignments.

2. ***Design Notebook:***
   - Each student will maintain a Design Notebook, which documents work on his/her aspect of the design.
   - Bring notebooks to all meetings. Students without notebooks will be asked to leave meetings.

3. ***Ethics assignment:*** This will be an individual written assignment, dealing with professional ethics, based on discussions in class. Details to be provided.

4. ***Peer Assessment:*** Periodically throughout the semester, you will be required to fill out peer evaluation forms, assessing other members of your team. These can be used to identify potential

problems before they can significantly impede the group's progress. The assessments will be used as part of the "teaming skills" component of the grade. For situations in which an individual does not contribute significantly to the team's design effort, the group component of the grade will be discounted for the non-productive team member. This is rare, but has been done 3 times over the past 10 years, and in all cases, the remaining team members were supportive of the action.

GRADING

The final course grade will be a combination of a *Team grade*-- same grade for all team members-- and an *individual grade*-- different grade for each student. The specific breakdown is shown in Table 1.

Table 1: ME 410 Grade Breakdown

	Team Grade	Individual Grade
Conceptual Design Update Report	5 %	
Work Plan	5%	
Mock-up Plan	5 %	
Progress report:	5 %	5 %
Mock-up	5 %	
Overall Team Design [1]	20 %	
Overall Individual Design [2]		20 %
Communication Skills [3]	5%	10 %
Teaming skills[4]		5 %
Participation [5]		5 %
Ethics Assignment		5 %
Total	50%	50%

NOTES:
See Table 2 for a summary of which deliverables/activities will contribute to the various overall grades.

1. The **Overall Team Design** grade will be determined based on the following criteria:
   a. Success at achieving mission objectives
   b. Level of effort
   c. Use of analysis for making design choices, in particular, the use of trade studies to optimize the design.
   d. Level of difficulty of mission/project
   e. Creativity in both design choices and approach to analysis.
   f. Teamwork (Level of interaction of team members in working toward common goal)

   The team scoring the highest on this will receive The Outstanding Aerospace Design Project Award. The award will be presented at the Department's award ceremony (date and time TBA) and will be recognized at the College of Engineering Commencement Ceremony.

2. The **Overall Individual Design** grade will be based on the following criteria
   a. Level of effort throughout the semester and completeness
   b. Use of analysis for making design choices, including the extent of optimization
   c. Level of difficulty of functional area, including availability of tools and information.
   d. Creativity in both design choices and approach to analysis.
   e. Contribution to team

ME 410 Flight Vehicle Design II Spring 2010
Information Sheet

3. The **Team Communications Skills** grade and **Individual Communications Skills** grade will be based on evaluation of presentation skills for the oral reports and evaluation of the format and quality of writing for written assignments.

4. The **Teaming Skills Grade** will be based on the following:
   a. Performance as meeting leader at meetings.
   b. Performance as secretary at meetings.
   c. Peer evaluations. This will include how your teammates assess you as well as the extent to which you realistically assess the team's performance and the lessons you learn from the experience.

5. The **Participation** grade will be based on the following: (1) Attendance at shop introduction, (2) attendance at meetings, (3) participation in class activities, and (4) participation in peer evaluations and presentation evaluations.

Once the overall numerical grades have been compiled and final letter grades assigned, a special adjustment may be applied under the following condition: if one team member far outperforms the rest of the team, based on the relative values of the overall individual and team grades, his/her grade will be increased by ½ letter grade. This adjustment is meant to reward individuals whose excellent work would be penalized by a particularly poor team effort, and will only be awarded in cases for which the discrepancy in the grades is dramatic.

Table 2: Summary of which deliverables/activities will contribute to the various grades

Grade→ / Deliverable/Activity ↓	Overall Team Design	Overall Individ. Design	Team Comm. Skills	Individual Comm. Skills	Team-Work	Partici-pation
Team Progress Report	√	√	√	√		
Design Review	√	√	√	√		
Final Report	√	√	√	√		
Final Presentation			√	√		
Team Meetings					√	√
Peer Evaluations					√	√
Class Activities						√
Shop Introduction						√

ME 410 Flight Vehicle Design II, Spring 2010
1/4/10

Wk	Dates	In-class activities	Milestones (W=Written, P=Presentation)
1	1/12		
	1/14	**Lecture**: Intro/Expectations	
		Schedule with Joe Estano	***Shop Introduction***
2	1/19	**Team Meetings:**	
	1/21	**Lecture:** Functional area expectations	
	1/25	**Report due on Monday at 9 AM**	***Updated Conceptual Design (W)***
3	1/26	**Lecture:** Functional areas/Work plan	
	1/28	**Functional Area Meetings:**	
	2/1	**Report due on Monday at 9 AM**	***Preliminary Design Work Plan (W)***
4	2/2	**Lecture:** Mock-up	
	2/4	**Team Meetings:**	
5	2/9	**Lecture:** Operating costs	
	2/11	**Team Meetings:**	
	2/12	**Report due on Friday at 4 PM**	***Mock-up Plan (W)***
6	2/16	**MONDAY SCHEDULE**	
	2/18	**Team Meetings:**	
7	2/23	**Lecture:** Aircraft Industry History	
	2/25	**Team Meetings:**	
8	3/2	**Group Presentation:**	***Prelim. Design Progress Report (P)***
	3/4	**Group Presentation:**	***Prelim. Design Progress Report (P)***
	3/5		***Peer evaluations due by 2 PM***
9		**SPRING BREAK**	
10	3/16	**Lecture:** Ethics	
	3/18	**Team Meetings:**	
	3/19	**Ethics assignment due by 4 PM**	***Ethics Assignment (W)***
11	3/23	**Lecture:** Aircraft Design Case Study-- Global Flyer	
	3/25	**Team Meetings:**	
12	3/30	**Lecture:** Techincal Writing I	
	4/1	**Team Meetings:**	
	4/5	**Mock-up due on Monday at 4 PM**	***Mock-up***
13	4/6	**Lecture:** Technical Writing II	
	4/8	**Team Meetings:**	
14	4/13	**Group Presentation:**	***Design Review (P)***
	4/15	**Group Presentation:**	***Design Review (P)***
15	4/20	**Team Meetings:**	
	4/22	**MONDAY SCHEDULE**	
16	4/26	**Report due at 4 PM**	***Final Design Report (W)***
	4/27	**Team Meetings:**	
	4/29	**Lecture:** Debriefing	***Peer evaluations due by 2 PM***
	TBA	**Group Presentation**	***Final Presentation (P)***