AE4358 - Syllabus

1. INSTRUCTORS

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2. COURSE OBJECTIVES

Objective 1	Identify and explain the purpose of key elements of a rotorcraft configuration.
Objective 2	Utilize actuator disk theory to analyze rotor system performance.
Objective 3	Utilize rotor blade element theory to analyze rotor system performance.
Objective 4	Predict rotorcraft performance such as maximum speed, maximum rate of climb, endurance, etc.
Objective 5	Use the Rf design process to size a rotorcraft configuration against a given mission.

3. COURSE TEXTBOOK

R. Prouty, Helicopter Performance, Stability, and Control, Krieger Publishing Company, Malibar, Florida, ISBN 1-57524-209-5, 2005.

4. GRADING

Grades will be determined based on demonstrated proficiency on homework sets, a laboratory project, a computer/design project, midterm examinations, a final examination, and an instructor grade. The relative weighting of each graded event is shown below:

Homework Sets	150 Points
Laboratory Project	150 Points
Computer Project	150 Points
Midterm Exam	250 Points
Design Project	300 Points

Letter grades will be determined based on the table below. Note that this course is not graded on a curve.

Points Total	Letter Grade
900-1000	A-, A
800-899	B-, B, B+
700-799	C-, C, C+
600-699	D
0-599	F

Occasionally, students will be offered the opportunity to obtain extra credit points. These points are added to the student's total while the total points for the course remains at 1000. The instructor reserves the right to add or subtract as much as 25 points from the point total of a student based on participation in the course.

5. HOMEWORK SETS

Several homework sets will be issued during the semester. These problem sets are intended to deepen understanding of the material. Unless stated otherwise, homework sets are to be submitted before class begins on the due date. Students are permitted to turn in one homework set up to 1 business day late. Otherwise, homework sets will not be accepted late.

6. LABORATORY PROJECT

This course includes a laboratory project that is intended to tie abstract mathematical topics to a real world rotor. The project will require students to measure characteristics of a small rotor system in hover and compare results with a theoretical model.

7. COMPUTER PROJECT

This course includes a project that is intended to reinforce the combined rotor blade element and momentum theory method for estimating rotor performance. The project requires computer programming.

8. DESIGN PROJECT

This course includes a project that is intended to deepen understanding of the Rf design process. The project requires computer programming.

9. ADDITIONAL INSTRUCTION

Supplemental instruction by the instructor and teaching assistant is a valuable resource available to any student having difficulty with a particular concept in the course. Get help when you have a problem! The instructor can be reached in Room 211-F Weber Space Science and Technology Building during office hours or by appointment. Another opportunity to obtain help from the instructor is in the classroom just before class begins or just after class ends. Be prepared to ask specific questions that concisely articulate unclear concepts.

Drop-in visits to the instructor or teaching assistant outside of their office hours are not welcome.

10. COURSE ETHICS

Students are expected to uphold high ethical standards including adherence to the Georgia Institute of Technology Honor Code, Academic Regulations and Student Regulations.

You are permitted and to a great extent encouraged to seek the advice of others. However, there is an obvious difference between a constructive discussion about a homework problem with a classmate and copying a classmate's homework. Copying is not permitted. Any help/advice you receive must be fully documented so that you do not falsely represent yourself and your work. All material submitted for grade must contain complete documentation including a "References" section appended to the end of each submission. The following table lists some examples of how to properly document your work.

Situation Description	Proper Reference Citation
Using only the course notes, you complete a homework set.	References: None
You work with a group to complete a homework set.	References: I worked concurrently with Joe Smith, Karen Peavy, and John Shu on this homework set as part of a study group.
You are stuck on how to draw the free body diagram for one of the problems in a homework set and ask John Smith how he approached the problem.	References: John Smith explained how to set up the free body diagram on problem 1.
You cannot get your computer program to properly simulate a system and Sally Yam looks at your computer code and points out the problem.	References: Sally Yam looked at my computer code and pointed out the bug in my code.

Note that none of the examples listed above would results in a loss of points to the student.

11. APPROXIMATE SCHEDULE

Lesson Number	Lesson Title	Date of Instruction	Notes
1	Course Introduction (Lecture)	21 Aug 2006	
2	Rotorcraft Missions (Movie)	23 Aug 2006	
3	CAD & CAM Software 1 (Computer Lab)	25 Aug 2006	Class in Computer Lab
4	Rotorcraft History, Terminology, Configurations (Lecture)	28 Aug 2006	
5	Hovering Flight - Actuator Disk Theory (Lecture)	30 Aug 2006	
6	CAD & CAM Software 2 (Computer Lab)	1 Sept 2006	Class in Computer Lab
7	Labor Day - No Class	4 Sept 2006	
8	Hovering Flight - Blade Element Theory (Lecture)	6 Sept 2006	
9	CAD & CAM Software 3 (Computer Lab)	8 Sept 2006	Class in Computer Lab
10	Hovering Flight - Actuator Disk/Blade Element Theory (Lecture)	11 Sept 2006	
11	Hovering Flight - Thrust and Power Calculations (Studio)	13 Sept 2006	Bring Calculator to Class
12	CAD & CAM Software 4 (Computer Lab)	15 Sept 2006	Class in Computer Lab
13	Hovering Flight - Rotor Efficiency (Lecture)	18 Sept 2006	
14	Hovering Flight - Tip and Root Losses (Lecture)	20 Sept 2006	
15	Weight and Balance Software (Computer Lab)	22 Sept 2006	
16	Hovering Flight - Ground Effect (Lecture)	25 Sept 2006	
17	Hovering Flight - Download (Lecture)	27 Sept 2006	
18	Hover Download Software (Computer Lab)	29 Sept 2006	Class in Computer Lab
19	Hovering Flight - Rotor Test Stand Apparatus (Lecture)	2 Oct 2006	
20	Rotor Test Stand Laboratory (Experimental Lab)	4 Oct 2006	Class in Costello Lab
21	Rotor Test Stand Laboratory (Experimental Lab)	6 Oct 2006	Class in Costello Lab
22	Vertical Flight - States of a Rotor (Lecture)	9 Oct 2006	
23	Vertical Flight - Climb (Lecture)	11 Oct 2006	
24	Vertical Flight - Performance (Studio)	13 Oct 2006	Class in Computer Lab
25	Fall Break - No Class	16 Oct 2005	
26	Forward Flight - Actuator Disk Theory (Lecture)	18 Oct 2006	
27	GTPDP Computer Program 2 (Computer Lab)	20 Oct 2006	Class in Computer Lab
28	Forward Flight - Blade Element Theory (Lecture)	23 Oct 2006	
29	Forward Flight - Closed Form Solutions (Lecture)	25 Oct 2006	
30	Hescomp Computer Program (Computer Lab)	27 Oct 2006	Class in Computer Lab
31	Forward Flight - Energy Analysis (Lecture)	30 Oct 2006	
32	Forward Flight - Performance (Lecture)	1 Nov 2006	
33	Vascomp Computer Program (Computer Lab)	3 Nov 2006	Class in Computer Lab
34	Power Off Flight - Autorotation (Lecture)	6 Nov 2006	
35	Power Off Flight - Deadman's Curve (Lecture)	8 Nov 2006	
36	Power Off Flight - Performance Calculation (Studio)	10 Nov 2006	
37	Design - Introduction (Lecture)	13 Nov 2006	Team Selection
38	Design - Rf Method 1 (Lecture)	15 Nov 2006	
39	Midterm Exam	17 Nov 2006	Closed Book, Closed Notes, 1 8.5''X11'' Sheet Allowed for Reference During Exam
40	Design - Rf Method 2 (Lecture)	20 Nov 2006	
41	Thanksgiving Holiday - No Class	22 Nov 2006	
42	Thanksgiving Holiday - No Class	24 Nov 2006	

43	Design - Rf Method 3 (Lecture)	27 Nov 2006	
44	Design - RFP Analysis (Lecture)	29 Nov 2006	
45	Design Project - Team Meeting	1 Dec 2006	Teams Meet in Class
46	Design Project - Team Meeting	4 Dec 2006	Teams Meet in Class
47	Design Project - Team Meeting	6 Dec 2006	Teams Meet in Class
48	Design Project - Team Briefings	8 Dec 2006	