

AEM 402-001
Aerospace Design I

Instructor: Dr. James P. Hubner
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Lecture Hours: MWF 2:00 pm – 2:50 pm, SERC 1014

Office Hours: TR 10:00 – 11:30 am or by appointment

Credit Hours: 3

Requisites: AEM 341, AEM 368, AEM 413; AEM 408 with concurrency

Required Text: *Introduction to Aeronautics: A Design Perspective*, 3rd ed. (and companion software AeroDYNAMIC 3.0), SA Brandt, ISBN 978-1-62410-327-8

Other Sources: Material for this course will be draw upon several sources, include
Aircraft Design: A Conceptual Approach, DP Raymer
Introduction to Design of Fixed-Wing Micro Air Vehicles: Including Three Case Studies, TJ Mueller et al.
Fluid-dynamic Drag, SF Hoerner
Engineering Design, RJ Eggert
Writing Styles and Standards in Undergraduate Reports, Donnell, Jeter, MacDougall, & Snedeker
The Ultimate Writing Guide for Students, M Fogarty

Other reference material will be identified in lecture and are available either online, [Rogers Library](#), or my office.

Web Page: Blackboard will be used as the class web portal. **For technical questions regarding Blackboard Learn, contact the Office of Information Technology at 348-3532.**

Course/Catalog

Description: Preliminary design techniques for an aerospace system.

Objective: To create a preliminary design of an aircraft or aeronautical-related system to meet defined engineering design specifications and transition into critical and final design stages in the second semester.

Learning Goals:

Students completing Aerospace Design I should be able to

- apply accumulated knowledge of aerospace engineering sciences,
- apply new knowledge from in-course special lecture topics and student directed research,
- engage in teamwork to develop a preliminary of an aerospace system,
- plan simulations or experiments to test design concepts,
- conduct productive and regular work meetings,

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- manage activities and time devoted to team meetings including brainstorming, division of labor, scheduling (agendas, time keeping), and presentations,
- create a budget and seek necessary funding,
- produce progress documents and design reports,
- and assess societal impact of system designs or understand and follow safety regulations of build-and-compete competitions.

Topics: Lecture topics, class meetings, and assignment due dates are posted on the schedule (last page).

Class Policies: Attendance and on-time arrival is expected. Lab safety procedures are to be followed at all times.

Make-up for missed assignments is permitted on a case-by-case basis and requires proper documentation. Consult with the instructor prior to the conflict for known events and as soon as possible after the conflict for unforeseen events.

Grades: Course grades will be based the following breakdown:

PDR & Presentation:	35%
Assignments:	30%
Participation & Notebooks:	15%
Safety & Lab Upkeep:	10%
Final Exam:	10%

The final letter grade of a team or individual may be reduced further based on lack of participation or poor laboratory and testing safety procedures. A warning will be administered first in the attempt to remedy the situation.

**Academic
Misconduct:**

All students in attendance at The University of Alabama are expected to be honorable and to observe standards of conduct appropriate to a community of scholars. The University of Alabama expects from its students a higher standard of conduct than the minimum required to avoid discipline.

Honor Pledge: "I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedures that will result from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University."

Services: If you are registered with the Office of Disability Services (<http://ods.ua.edu>), please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary. If you have a disability but have not contacted the Office of Disability Services, please call (205) 348-4285 (Voice) or (205) 348-3081 (TTY) or visit 1000 Houser Hall to register for services. Students with

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disabilities must be registered with the Office of Disability Services before receiving accommodations.

University counseling services are available at <http://sa.ua.edu/counseling>.

The University of Alabama is committed to an ethical, inclusive community defined by respect and civility. The UAct website (www.ua.edu/uact) provides a list of reporting channels that can be used to report incidences of illegal discrimination, harassment, sexual assault, sexual violence, retaliation, threat assessment or fraud.

Weather: The guiding principle at The University of Alabama is to promote the personal safety of students, faculty and staff during severe weather events. Please be familiar with UA's severe weather guidelines (<http://uanews.ua.edu/weather/>) and be prepared to quickly move to safety if severe weather occurs. In general, classes will remain in session until the National Weather Service issues tornado warnings for the Tuscaloosa metro area.

UAct: The University of Alabama is committed to an ethical, inclusive community defined by respect and civility. The UAct website (www.ua.edu/uact) provides extensive information on how to report or obtain assistance with a variety of issues, including issues related to dating violence, domestic violence, stalking, sexual assault, sexual violence or other Title IX violations, illegal discrimination, harassment, child abuse or neglect, hazing, threat assessment, retaliation, and ethical violations or fraud.

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Schedule

AEM 402 Integrated Aerospace Design I				
WK	Day	Date	Description	Assignment Due
0	W	08/17/16	Course Policies/Procedures	
0	F	08/19/16	Design Project & Design Process	Chp 1.1 - 1.7
1	M	08/22/16	Project Planning & Teamwork	
1	W	08/24/16	Reverse Engineering	
1	F	08/26/16	Design Studio/Open	
2	M	08/29/16	Report Writing and Document Storage	
2	W	08/31/16	House of Quality	Chp 1.8
2	F	09/02/16	Formulation and Concept Design	PR
3	M	09/05/16	Classes Dismissed - Labor Day	
3	W	09/07/16	Sizing and Constraint Analysis	Chp 8 & 9
3	F	09/09/16	Sizing and Constraint Analysis	Rev Eng HW
4	M	09/12/16	Elements of the Preliminary Design Report	
4	W	09/14/16	Ethics	
4	F	09/16/16	Design Studio/Open	PR, Sizing HW
5	M	09/19/16	Technical Standards	
5	W	09/21/16	Rotor Theory	
5	F	09/23/16	Design Studio/Open	Ethics HW
6	M	09/26/16	Aerodynamic Testing	
6	W	09/28/16	Structural Testing	
6	F	09/30/16	Design Studio/Open	PR, PS
7	M	10/03/16	Laboratory Safety Procedures	
7	W	10/05/16	UA Shop and CUBE Facilities & Procedures	
7	F	10/07/16	UA Shop and CUBE Facilities & Procedures	EHS Training
8	M	10/10/16	Micro-controllers	
8	W	10/12/16	Design Studio/Open	
8	F	10/14/16	Design Studio/Open	PDR
9	M	10/17/16	PDR Presentations	
9	W	10/19/16	PDR Presentations	
9	F	10/21/16	PDR Presentations	
10	M	10/24/16	PDR Feedback	
10	W	10/26/16	Funding & Proposals	PR, PS
10	F	10/28/16	Classes Dismissed - Fall Break	
11	M	10/31/16	Purchasing/Financial Management	
11	W	11/02/16	Elements of the Critical Design Report	
11	F	11/04/16	Design Studio/Open	
12	M	11/07/16	Parametric Design/Optimization Example	Funding Proposal
12	W	11/09/16	Parametric Design/Optimization Example	
12	F	11/11/16	Design Studio/Open	PR
13	M	11/14/16	Design Studio/Open	
13	W	11/16/16	Design Studio/Open	
13	F	11/18/16	Design Studio/Open	Design HW
14	M	11/21/16	Design Studio/Open	
14	W	11/23/16	Classes Dismissed - Thanksgiving	
14	F	11/25/16	Classes Dismissed - Thanksgiving	
15	M	11/28/16	Design Studio/Open	
15	W	11/30/16	Design Studio/Open	
15	F	12/02/16	Lab Clean-up, Storage & Inspection	PR, PS, Lab Inspection
16	T	12/06/16	Final Exam	

HW = Homework, PR = Progress Report, PS = Participation Survey