

AEM 121
Introduction to Aerospace Engineering

Instructor: Dr. James P. Hubner
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Lecture Hours: 9:00 – 9:50 am MWF, 208 Gordon-Palmer (<http://tour.ua.edu/tourstops/gordonpalmer.html>)

Office Hours: 9:00 – 11:00 am Tuesday and Thursday, or by appt.

Credit Hours: 2

Requisites: MATH 112 (co)

Text: Required: Wegener, PP, *What Makes Airplanes Fly?*, Springer, 2nd ed.

Web Page: Log in to <http://ualearn.blackboard.com> with your myBama account information and select **201240-AEM-121-001**. Course documents, HW assignments, lecture material and other material will be posted at this site.

For technical questions regarding Blackboard Learn, contact the Office of Information Technology at 348-3532.

Description: A survey of aerospace history and topics that promote an understanding of aerospace engineering and the profession.

Objective: To introduce basic concepts and calculations that pertain to aerospace engineering.

Class Policy:

Lecture: Attendance and on-time arrival is expected. Reading assignments are to be completed **prior** to class. **An attendance/reading quiz will be given every week. There are no make-up quizzes; two free drops are provided.** Students are responsible for all scheduling and policy announcements made in class. Power-off electronic items that can disturb the lecture or distract your attention.

Recitation periods will be held each Friday during the scheduled class period. Attendance is optional.

Homework: Weekly homework assignments will be announced in lecture and posted on the course Blackboard Learn web page. **HW is due at 5:00 pm on each Monday as indicated on the course schedule** (page 3). HW assignments will consist of problems relating to the lecture notes, text and other sources. **Late HW will not be accepted; one free HW drop is provided.**

HW solutions must be neat and orderly else points will be deducted or the assignment not accepted (review the Example HW posted on the course web page). Discussion among students regarding HW solution techniques is fine; copying HW is not acceptable.

A group project will be assigned and will comprise 15% of the final grade.

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Exams: One in-class exam and one final exam will be administered. The exams will cover both text and lecture material. If you have a scheduled event which prevents you from taking the exam, contact the instructor during the first two weeks of the semester to resolve the conflict. The resolution of a to-be-missed exam requires prior notification, proper documentation and will be handled on a case-by-case basis.
Make-up exams, if eligible, may be oral.

Grades: Grades will be based on HW, quizzes and one exam using the following breakdown:

Quizzes	10%
HW:	50%
Project:	15%
Exams:	25%

90% will earn at least an	A-
80% will earn at least a	B-
70% will earn at least a	C-
60% will earn at least a	D-
< 60% is failing	F

All regrade requests must be submitted in writing by the following lecture period after the assignment is returned. A thorough and clear explanation of the issue and a suggested amount of points to be credited must be supplied with the regrade request. If requested, the entire assignment in addition to the specific points in question can be reviewed. The resulting grade may be higher, lower or no change.

Services: Students requiring disability services must follow the ODS (<http://ods.ua.edu>) guidelines.

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

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.

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Schedule

Date	Topic	Reading	HW Due
Aug	22 Course Policies, Road Map, AEM Dept		
	24 Aerospace History	1.1 – 2.2	
	27 Aerospace Industry	Ref 1	
	29 Airplane and Rocket Anatomy	App 2.1	
	31 <i>Recitation</i>		
Sep	3 <i>No Classes, Labor Day</i>		
	5 Dimensions and Similarity Parameters	App 2.2 – 2.3	1
	7 <i>Recitation</i>		
	10 Flow and Fluid Properties	3.1 – 3.2	2
	12 Earth Atmosphere	4.1 – 4.3	
	14 <i>Recitation</i>		
	17 Kinematic and Force Vectors	5.1	3
	19 Conservation Equations	5.2	
	21 <i>Recitation</i>		
	24 Wind Tunnels	6.1 – 6.2	4
	26 Wind Tunnel Lab		
	28 <i>Recitation</i>		
Oct	1 <i>Review</i>		5
	3 Exam		
	5 Fall Break		
	8 Viscous Effects	5.3 – 5.4	
	10 Aerodynamic Drag	7.1 – 7.4	
	12 <i>Recitation</i>		
	15 Aerodynamic Lift	8.1 – 8.4	6
	17 CFD/Tornado	Ref 2	
	19 <i>Recitation</i>		
	22 Aircraft Performance	Ref 3	7
	24 Aircraft Stability & Control	9.1	
	26 <i>Recitation</i>		
	29 Group Project Defined		8
	31 [†] Aircraft Structures & Materials		
Nov	2 <i>Recitation</i>		
	5 Aircraft Propulsion	9.2	9
	7 Supersonic & Hypersonic Flight/Test Facilities	10.1 – 10.2	
	9 <i>Recitation</i>		
	12 Orbital Mechanics	Ref 4a	10
	14 Spacecraft & Rocket Propulsion	Ref 4b	
	16 <i>Recitation</i>		
	19 <i>No Class</i>		
	21 <i>Thanksgiving Break</i>		
	23 <i>Thanksgiving Break</i>		
	26 Project Work Day		11
	28 Guest Speaker		
	30 Project Competition		
Dec	3 Project Results and Discussion		
	5 Future of Air & Space Transportation	11.1–11.2, Ref 5	FR[§]
	7 <i>Review</i>		
	10 Final Exam: 8 am		

[†]Oct 31st is the last day to drop this course (and AEM 121) with a grade of W.

[§]Group Project Final Report

References on next page.

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References

- Ref 1: <http://www.careercornerstone.org/pdf/aerospace/aeroeng.pdf>
- Ref 2: <http://www.redhammer.se/tornado/manual.pdf> ; Read thru pg 6—skim the rest.
- Ref 3: C Waltham (1999) “The flight of a balsa glider,” *Am Jrn Phys* **67**(7):620-623
<http://scitation.aip.org/getpdf/servlet/GetPDFServlet?filetype=pdf&id=AJPIAS00006700000700062000001&idtype=cvips&prog=normal> or http://www.physics.ubc.ca/~waltham/pubs/balsa_glider_35.pdf
- Ref 4a: <http://www2.jpl.nasa.gov/basics/index.php>, Chp 3(first four content pages).
- Ref 4b: <http://www2.jpl.nasa.gov/basics/index.php>, Chps 9 and 14.
- Ref 5:
http://www.aviationweek.com/aw/blogs/aviation_week/on_space_and_technology/index.jsp?plckController=Blog&plckBlogPage=BlogViewPost&newspaperUserId=a68cb417-3364-4fbf-a9dd-4feda680ec9c&plckPostId=Blog%3aa68cb417-3364-4fbf-a9dd-4feda680ec9cPost%3ac906b912-4f2d-4e83-8331-ed59fa188034&plckScript=blogScript&plckElementId=blogDest