

**AEM 368 Flight Dynamics and Controls I**  
**Spring 2017**  
**Time: M/W 10:00 – 11:50 am (4 credits)**  
**Location: North Lawn 1012**

**Objectives:** Introduction to aircraft dynamics including performance and stability and control.

**Professor:** Dr. Charles O'Neill, AEM, 222 Hardaway  
Email: croneill@eng.ua.edu Phone: (205) 348-5161  
Please include "AEM368 <subject>" in the email subject line to ensure priority

**Teaching Assistant:** Mr. Rahman, arahman2@crimson.ua.edu, Hours and Location: TBD

**Office Hours:** Open door policy or by appointment.

**Class Website:** <http://charles-oneill.com/aem368/> (Notes are posted here)

**Required Books:** *Flight Stability and Automatic Control*, R. Nelson, McGraw-Hill, 2<sup>nd</sup> ed, 1998.  
*Aircraft Performance and Design*, John Anderson, McGraw-Hill, 1999.

**Prerequisites:** AEM 311 (Fluid Mechanics) and AEM 264 (Dynamics)

**Goals:**

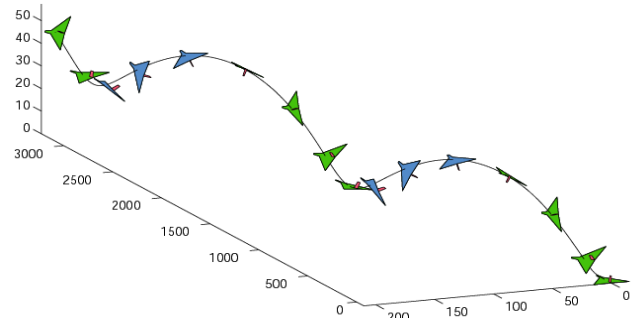
By the end of the course, students should be able to:

- Understand basic aircraft performance and stability and control (S&C) terminology
- Estimate aircraft performance in steady and accelerated flight mission phases
- Size S&C surfaces of an aircraft
- Demonstrate a physical and mathematical understanding of aircraft flight modes

**Topics:**

We will cover S&C and performance topics in the textbooks. Selected topics and sources supplement the text.

- Aircraft Nomenclature, Atmosphere, Instruments
- Static stability and control (FSAC, Chap 1)
- Aircraft equations of motion (FSAC, Chap 2)
- Longitudinal motion (FSAC, Chap 3)
- Lateral motion (FSAC, Chap 4)
- Steady Flight (APD, Chap 5)
- Accelerated Flight (APD, Chap 6)
- Aircraft Performance and Control Projects



**Additional Resources and References:**

You may wish to consult or browse the following resources for additional insight and examples. These are completely optional.

- *Aerodynamics, Aeronautics and Flight Mechanics*, McCormick. 1995.
- *AVL*, Prof. Drela, MIT, (free software).
- *DATCOM, USAF, (free)*

**Exam and Assignment Schedule:**

- Three equally weighted [100 pts each] exams (tentative: 5<sup>th</sup> week, 10<sup>th</sup> week, final).
- Homework is assigned every other week and is due the following week [100 pts total]
- One aircraft performance and one stability and control project [100 pts each]

**Simulation and Analysis:**

Computer analysis and by-hand mathematics is necessary in this course. Matlab is ideal. C/C++ is ok.

## Grades:

Your final score is the sum of all exam, homework and project scores. The lowest homework score will be dropped. The lowest score among your exams **or** homework will be dropped for a total of 500 pts in the course. Projects are not dropped.

$$\text{Score} = (\text{Exams} + \text{Homework} + \text{Projects})/500$$

The guaranteed-maximum letter grade cutoffs are:

Grade	Score
A+	97
A	93
A-	90

Grade	Score
B+	87
B	83
B-	80

Grade	Score
C+	77
C	73
C-	70

Grade	Score
D+	67
D	63
D-	60

Additionally, your time rate of change will be tracked. Consistent improvement will **always** increase your grade. Scores are uploaded to Blackboard.

## Errors and Typos

Finding typos and errors in the books or in the notes is worth a **reward**. Nelson's book in particular has many typos; document the issue and bring it to the instructor. I will do my best to correct and disseminate these ASAP.

## Attendance Policy:

Students are strongly encouraged to participate in class. Please interrupt the lecture to ask questions. Formal attendance records are never kept.

## Missed/Late Coursework Policy:

Late work is graded at a step discount of 10% per day. Inform me ASAP if your job (e.g. military, industry, off-campus research, etc.) has unpredictable schedules or out-of-contact duties. I **will** work with you.

## 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. At the beginning of each semester and on examinations and projects, the professor, department, or division may require that each student sign the following Academic 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 procedure resulting from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University."*

## Disability Statement:

If you are registered with the Office of Disability Services, please make an appointment with me as soon as possible to discuss any course accommodations that may be necessary or prudent.

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 133-B Martha Parham Hall East to register for services. Students who may need course adaptations because of a disability are welcome to make an appointment to see me during office hours. Students with disabilities must be registered with the Office of Disability Services, 133-B Martha Parham Hall East, before receiving academic adjustments.

## Additional University Policies:

For a comprehensive list of University policies, visit the AEM 368 page at <http://syllabi.ua.edu>

## Syllabus Modifications:

Every feasible effort will be taken to follow this syllabus. In the event of changes or corrections, I will consult with the class and notify the entire class immediately via email or a written document.

CG at 88% MAC

