

AEM 617 Aircraft Systems
(enrolled as 691.001 and 691.996)

Spring 2016

Time: M/W/F 11:00 - 11:50 pm

Location: 212 H.M. Comer

Objectives: The principal objective of this course is to establish, develop, and refine capability in the integrated analysis and interdependency of aircraft systems

Professor: Dr. Charles O'Neill, AEM, 222 Hardaway
Email: croneill@eng.ua.edu Phone: (205) 348-5161

Office Hours: Open door policy or by appointment.

Class Website: <http://charles-oneill.com/aem617/>

Books: *Aircraft Systems*, Ian Moir and Allan Seabridge, AIAA, 2001
The YC-14 STOL Prototype, Wimpres and Newberry, AIAA, 1998

Prerequisites: Engineering BS or consent of instructor

Goals:

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

- Demonstrate a conceptual, practical and integrated understanding of aerodynamic, structural, propulsive and mission systems.
- Demonstrate design, diagnostic, and modification capability for multi-disciplinary optimization (MDO) of case-study and clean-sheet aircraft.
- Demonstrate life cycle, regulatory, and risk analysis of comprehensive aircraft systems

Topics:

We will cover topics in Moir's book and the YC-14 case study. Selected topics and sources supplement the text.

- Review: atmosphere, airspeed, compressible flow, aerodynamics systems
- Flight Control Systems, Engine Control Systems, Fuel Systems, Hydraulics Systems, Electrical Systems, Pneumatics Systems, Environmental Control Systems (ECS), Emergency Systems, Avionics
- Structural: v-n diagrams, loads, actuators, configurations, weight, aeroelastics
- Case studies: Boeing 727 development, YC-14 STOL prototype, F-16 design, ...
- Safety, reliability, regulatory and lifecycle issues
- Lecture topics of students' choosing

Grading:

Your grade depends on 3 components. Your final score is the sum of all exam and project scores.

$$\text{Score} = \text{Exams} + \text{Lecture} + \text{Projects}$$

Your letter grade is assigned based on the distribution of scores. The guaranteed cutoffs are: A \geq 90, B \geq 80, C \geq 70, D \geq 60, F $<$ 60. As this is a graduate course, intermediate grades (+ and -) are not applicable. The time derivative of your scores will be evaluated to potentially improve your grade.

Exam and Assignment Schedule:

- Engineering Skills Quiz (2nd week) worth 10 pts on exam score.
- Two equally weighted (100 pts each) exams (c. 8th week, final).
- Semi-weekly homework and case study projects worth 200 pts total.
- One 40 minute lecture on an aircraft systems subject in which you are either an expert or you wish to become an expert. Students should contact the instructor early to schedule the topic and date. The lecture is worth 100 pts.

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 week. 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.