AEM 617/517/417 Aircraft Systems
Spring 2018
Time: MWF 1300-1350
Location: Hardaway 251

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/Text: (617) 449-8206

Office Hours: Open door policy or by appointment.

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

Books: *Civil Avionics Systems*, Ian Moir, AIAA, 2nd ed.
Boeing 727: Case Studies in Aircraft Design, AIAA.
The YC-14 STOL Prototype, Wimpress and Newberry, AIAA.

Selected Resources: Aircraft Systems, Moir and Seabridge, AIAA.
Digital Avionics Handbook, Spitzer, CRC Press, 3rd ed.
Applied Mathematics in Integrated Navigation Systems, Rogers, AIAA

Prerequisites: Engineering/Physics background

Goals:

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

- Demonstrate a conceptual, practical and integrated understanding of aerospace 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
- Develop and demonstrate a electromechanical system

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:

The course has 500 total points available. As a graduate course, the guaranteed cutoffs are: A≥90%, B≥80%, C≥70%, D≥60%, F<60%. Intermediate grades (+ and -) are not applicable for a graduate course. The grading rubric is one consistent with an engineer entering the workplace.

1. Do what you say you will do, or better.
2. Do it at the price agreed to, or lower
3. Do it on time, or earlier

Certain topics in this course may be challenging or completely new to you. Keep me updated.

Exam and Assignment Schedule:

- One midterm exam (ca. 8th week) worth 100 pts.
- Case studies / homework worth 100 pts total.
- One avionics electro-mechanical actuator system design project worth 100 pts.
- One aircraft museum visit with report (ca. 14th week) worth 100 pts.
- One 40 minute lecture on an aircraft systems subject in which you are either an expert or you wish to become an expert. 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 25% 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.

Additional University Policies:
For a comprehensive list of University policies applicable to this course, visit the AEM 617 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, the class will be notified.