

Rocket Reentry Research

AEM 491-003

Spring 2016

Time: T/Th 9:00-10:40

Location: M-11 Hardaway

Objectives: Research and development of aerospace vehicles operating in planetary atmospheres

Professor: Dr. Charles O'Neill, AEM, 222 Hardaway
Email: croneill@eng.ua.edu Cell Phone: (617) 449-8206

Office Hours: Open door policy or by appointment.

Textbooks: *None*

References: *Flight Vehicle Aerodynamics*, Mark Drela, MIT Press, 2014
Fluid-Dynamic {Lift, Drag}, Hoerner and Borst

Prerequisites: Consent of Instructor

Goals:

By the end of the class, students will:

- Develop a conceptual design for the NASA HIADS student competition
- Submit an engineering design report to the HIADS competition
- Develop a prototype vehicle for static plasma testing
- Develop a 6 DOF aerospace vehicle simulator for rocket trajectory estimation

Topics:

- Mars atmosphere
- Simulation techniques for reentry simulation
- CFD analysis of aerospace vehicles

Assignment Grading and Schedule:

- [10%] Mars atmosphere model *or* 6DOF solver
- [10%] CFD analysis of vehicle
- [40%] HIADS report (by 3/5/16) *or* AIAA presentation
- [40%] Prototype vehicle operating (by 5/7/16)

Grading:

The grade cutoffs are: A>90, B>80, C>70, D>60, F≤60. Plus and minus grading is based on the time derivative of performance.

Attendance Policy:

Students are strongly encouraged to participate in class. Formal attendance records are not kept.

Missed/Late Coursework Policy:

Missed or late work is not accepted without either prior approval of the instructor or a doctor's medical note.

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.

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.