

## **AE 6355 Syllabus**

Planetary Entry, Descent, and Landing, Section A/Q, 3 Credits

Summer 2026

### **Instructor Information**

---

**Instructor: Dr. John Dec**

**Email: [jdec3@gatech.edu](mailto:jdec3@gatech.edu)**

### **General Course Information**

---

#### **Description**

Atmospheric entry flight mechanics and dynamics, aerothermodynamics, thermal protection systems, aerodynamic decelerators, descent, and landing. Robotic and human exploration mission studies for aerobraking, planetary entry, aerocapture.

#### **Course Learning Outcomes**

Upon successful completion of the course, you should be able to:

- Be fluent in the common terminology used in the field of Planetary Entry, Descent, and Landing.
- Approximate the lift and drag coefficients of a hypersonic, blunt body entry vehicle.
- Simulate the flight trajectory of both ballistic and lifting entry vehicles in any planetary atmosphere.
- Assess the aerodynamic heating environment in the stagnation point region of a blunt body entry vehicle.
- Define the thermal protection system requirements for a blunt body entry vehicle.
- Define the requirements for terminal descent: parachutes, propulsion, and landing systems.

#### **Required Course Materials**

##### **Required Text**

None

##### **Recommended Texts**

Regan & Anandkrishnan, *Dynamics of Atmospheric Re-Entry*, AIAA Education Series, 1993.

Anderson, John D., *Hypersonic and High Temperature Gas Dynamics*, 3<sup>rd</sup> Edition, AIAA Education Series, 2019

Vinh, Busemann and Culp, *Hypersonic and Planetary Entry Flight Mechanics*, 2nd edition, University of Michigan Press, 1980. Note this book is out of print and hard to find, I have a very poor-quality pdf of a NASA Technical report from which the book is based and will provide to students

**Grading Policy:**

- 10% Homework
- 30% Midterm
- 30% Computer Project Phase 1
- 30% Final Exam

A 90-100; B: 80-90; C: 70-80; D: 60-70

**Description of Graded Components**

The midterm and final are closed book, closed note exams. You are allowed one 8.5 x 11 equation sheet. The midterm will be given during the normal class period, the final at the designated time dictated by the registrar. The project for the course requires computer programming in a language of your choice, although MATLAB or C++ are preferred. You will be provided a MATLAB (or C++) library which computes the equilibrium flow properties downstream of normal and oblique shocks which you may incorporate into your own computer program. The computer project requires a final report.

**Course Policies**

---

**Attendance and/or Participation**

This will be an active classroom, where you will be expected to participate. I have noticed a drastic difference in the exam performance between students who regularly attend class and those who don't.

**Academic Integrity**

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review [Georgia Tech's Honor Code](#) and the student [Code of Conduct](#).

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

### **Core IMPACTS**

Not applicable

### **Accommodations for Students with Disabilities**

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](#) (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

### **Student-Faculty Expectations Agreement**

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. [The Student-Faculty Expectations](#) articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

### **Pre- &/or Co-Requisites**

None, but undergraduate knowledge of compressible flow and orbital mechanics will help

### **Collaboration, Group Work, and Use of Generative AI**

Generative AI-based assistance, such as, but not limited to ChatGPT and Copilot, is comparable to collaboration with other people – for an individual assignment, directly using the output from AI is a violation of the Honor Code, ie asking it to solve a homework problem, or write your computer project code.

This course is designed to teach you how to think analytically and develop your engineering intuition, so all work you submit must be your own. You should never include in your assignment anything that was not written/calculated directly by you without proper citation (including quotation marks and in-line citation for direct quotes).

Inclusion of anything you did not write/calculate on your own in your assignments without proper citation will be treated as academic misconduct case. If you are unsure if you have gone too far consider these two simple guidelines: (1) avoid hitting "copy" in a conversation with an AI assistant; (2) do not have both your assignment and the AI agent open at the same time. Avoid using tools that directly add content to your submission. Use of spell and grammar checkers are acceptable (and encouraged) for all assignments

### **Extensions, Late Assignments, & Re-Scheduled/Missed Exams**

- Homework assignments are due at 11:59pm the day they are due. Late homework assignments will incur a -10% per day for being "reasonably" late. The 10% penalty is prorated meaning if an assignment is 6 hours late, the penalty would be 2.5% taken off. Reasonably late is defined as **no more than 3 days**, assignments submitted after that time or after solutions are posted will not be accepted and receive a grade of 0%. If you have technical issues with Canvas around the submission deadline, you should immediately e-mail the TA's and copy me with the assignment attached and a brief explanation of the issues.
- Each student will be allotted 6, 24-hour late passes. You may use up to 3 at a time. These passes are binary, meaning if you are 6 hours late it counts as one pass. No free weekend passes. If an assignment is due on Friday at midnight, if you turn it in sometime on Monday that would require 3 passes. Passes may not be used when homework solutions need to be posted immediately after it is due, this typically happens on HW due before the midterm. The late passes may also be used for the computer project. **Late pass use must be declared at the time you submit the assignment by adding a comment in Canvas to your submission.**
- Extensions MAY be granted in cases where extenuating circumstances prevented the student from reasonably completing an assignment on time.

Examples include Illness (with a Dr's note via Office of Student Life), emergencies, family situations, and institute excused absences. In these cases, late passes do not need to be used.

- Extensions WILL NOT be granted for workload/time management issues and or normal stress encountered as an engineering student

The Office Student Life can assist you with documented emergencies and illnesses by contacting me on your behalf. Do not send me medical diagnoses or notes from Stamps, you can request assistance [here](#) and the Office of Student Life will notify me

### **Inclement Weather and Digital Learning Days**

In the event of inclement weather or other unforeseen event preventing us from meeting in-person, we will pivot to digital learning. A Zoom meeting will be created and posted on Canvas.

## **Campus Resources for Students**

---

Georgia Tech and the School of Aerospace Engineering understand that many students experience stress through a variety of academic, financial and personal experiences. We value you and want to make you aware of resources available to you should you need them. Your well-being and mental health are important, and we are here for you.

### **Student Academic Success Resources:**

- Center for Assessment, Referral and Education (CARE) <https://care.gatech.edu/>
- Campus Police (any emergency): 404-894-2500 <http://www.police.gatech.edu/>
- Counseling Center: 404-894-2575 <https://counseling.gatech.edu/>
- Dean of Students Office: 404- 894-6367 <https://studentlife.gatech.edu/>
- Georgia Crisis and Access Line: 800-715-4225
- National Suicide Prevention Lifeline: 800-273-TALK (8255)  
<https://suicidepreventionlifeline.org/>
- Crisis Text Line: Text HOME to 741741
- VOICE: Victims Survivor Support: (404) 385-4464 (or 4451)  
<http://healthinitiatives.gatech.edu/well-being/voice>
- Stamps Health Services <https://health.gatech.edu/contact>

### **Graduate Student Academic and Professional Success Resources:**

A list of resources for graduate students is given on the [Office of Graduate and Postdoctoral Education](#) website. Specific information for [current graduate students](#) includes

- Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;
- Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and

*[Professional Development](#) such as the programming from the Career Center and other professional development resources and events”*