

AE6343-A/Q/Q3 Aircraft Design I

Fall 2025 Syllabus

Course Instructor

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Introduction

This document provides basic information regarding the Aircraft Design I (FWD I) class for the Fall 2025 academic term. The course is listed as AE6343 for 3 credit hours in the course catalog of the Georgia Institute of Technology. Section A is for students on US campus, section Q is for distance learning students and section Q3 is for students on EU campus.

Students who are taking AE6343 Aircraft Design I in the A and Q sections should also register for AE6383 Applied Design Laboratory concurrently. AE 6383 is the laboratory portion of AE6343 where students will attend a series of seminars where they will improve their design skills and get familiar with the design tools available. Please read the following information carefully.

Students who are taking AE6343 Aircraft Design I in the A and Q sections and are planning on taking AE6344 Aircraft Design II in the Spring term must take AE6383 Applied Design Laboratory concurrently.

Class Website

The official FWD I class website is on Canvas at <https://canvas.gatech.edu/>. This website is intended to provide all official lecture material, handouts, presentations, notices and relevant information. Note that the website will be constantly updated and must be checked on a regular basis. All announcements are automatically emailed to your GT student account. It is the student's responsibility to maintain access to this account and address email filtering issues. To log in use your GT account username (usually your first name initial followed by your last name and a number, e.g., *gburdell3*) and your GT account user password. Once on Canvas, select the AE6343 course. Distance Learning students can access lecture videos through this website.

Lectures

For students in section A, the class meets Fridays from 2 PM to 4:45 PM EST in Lecture Hall 001 of the Weber Space Science and Technology (SST) building and section B at the same time in CoVE in the third floor of the Weber building. Students who are on the main Georgia Tech campus are expected to attend in person. Students in sections Q and Q3 are welcome to join the live lectures using the link on the class website. Regardless, the class recordings should be made available for students of all sections on the class website shortly after the end of the class.

Calendar

The official school calendar of Georgia Tech is provided by the Office of the Registrar and is available at <http://www.registrar.gatech.edu/home/calendar.php>. Check this calendar for finals dates and times.

Class Objective

- Students will learn the concepts behind fixed wing vehicle design by learning material covering a wide breadth of aerospace engineering disciplines.
- Students will apply those concepts through projects aimed at designing fixed wing vehicles.

Suggested References

The following textbooks are considered suggested for class. Most of the content discussed in the lectures will be derived from the following works:

- Raymer, D. P., *Aircraft Design: A Conceptual Approach*, 6th Ed., Reston, Va.: AIAA, 2018.
- Mattingly, J. D., Heiser, W. H., Pratt, D. T., *Aircraft Engine Design*, 2nd Ed., Reston, Va.: AIAA, 2002.

Specific reading assignments from the two above sources will be provided throughout the semester to complement the content covered in class.

If the students feel the need for additional information on topics covered during the course, they are pointed to the following supplemental works:

- Anderson, J. D., *Fundamentals of Aerodynamics*, 6th Ed., Boston: McGraw-Hill Higher Education, 2016.
- Anderson, J. D., *Aircraft Performance and Design*, Boston: McGraw-Hill, 1999.
- Nicolai, L., Carichner G., *Fundamentals of Aircraft and Airship Design, Volume 1 - Aircraft Design*, AIAA, 2010.
- Nicolai, L., Carichner G., *Fundamentals of Aircraft and Airship Design, Volume 2 - Airship Design and Case Studies*, AIAA, 2013.
- Torenbeek, E., *Synthesis of Subsonic Airplane Design*, Delft University Press, 1982.
- Torenbeek, E., *Advanced Aircraft Design: Conceptual Design, Technology and Optimization of Subsonic Civil Airplanes*, John Wiley & Sons, Incorporated, 2013.
- Gere, J. M., Goodno, B., *Mechanics of Materials*, 8th Ed., Cengage Learning, 2012.

- Hill, P. G., Peterson, C. R., *Mechanics and Thermodynamics of Propulsion*, 2nd Ed., Reading, Mass.: Addison-Wesley, 1991.
- Nelson, R. C., *Flight Stability and Automatic Controls*, 2nd Ed., Boston, Mass.: McGraw Hill, 1998.

Homework

A total of four homework assignments will take place throughout the semester. Each homework will be assigned on a specific topic. This is an individual assignment and students are expected to work on it alone. If it is suspected that the student has not submitted original work, they will be reported. The students will be responsible for uploading a PDF of their homework solution by 11:59 pm on Canvas.

Practice Quizzes

Similarly, at the end of major sections of the course, there will be a 10-15 online quiz that will be made available on Canvas to test the understanding of basic concepts as a practice. This will be a canvas quiz with multiple-choice/ true or false answers that can be taken any number of times and is ungraded.

Comprehensive Exam

There will be one comprehensive exam for this course. The exam will take place the week before thanksgiving and is closed notes, closed book. Students must bring a pencil and a non-programmable calculator. Examples of acceptable calculators:

- Texas Instruments TI-30XIIS
- Casio fx-300ESPLUS2
- Sharp EL-W535TGBBL
- HP 300s+

Students in the Q and Q3 sections will arrange a time with a proctor to take their exam. A Georgia Tech representative will reach out to these students with more details, but the current plan is to use digital proctoring for Q exams and a local proctor for A, B, and Q3 exams.

Class Projects

A two part semester long project will address material covered in lectures and give practical applications on design methodologies and tools. The first part of the project will be focused on the sizing and synthesis method taught in the early lectures of the course, while the second part will expand on that and include a multi-disciplinary analysis. All other details including instructions and project deliverables will be provided in project description handouts.

Peer & Self Assessments

Team members will assess the effort of themselves and each other against the target they deem to be appropriate. Each assessment will include a self-reflection on what can be improved individually. It will also include a section on identifying issues that can be improved if other team members can adjust their behaviors. Assessments are private between the instructors and the students and will not be shared with other students. A standardized form will be provided for collecting feedback.

Grading Policy

Table 1 shows the grade breakdown for this class.

Table 1: Grade Breakdown

Homework	20%
Project 1	15%
Project 2	15%
Midterm	20%
Final	30%
Attendance (see Table 2)	5% bonus
CIOS survey (see below)	5% bonus

Table 2: Attendance Bonus Points Policy

< 50%	0 points
50% to 70%	3 points
70% to 85%	4 points
85% and above	5 points

An additional 5% bonus points will be awarded to everyone in the class if $\geq 80\%$ of the class fills the CIOS survey.

The following scale relating numeric to letter grades will be used for the entire course:

- $90\% \leq A \leq 100\%$
- $80\% \leq B < 90\%$
- $70\% \leq C < 80\%$
- $60\% \leq D < 70\%$
- $0\% \leq F < 60\%$

Once an exam's answer sheets is graded and returned to the student, each student will have 48 hours to submit any disagreement with respect to their grading. Please note that a request for regrade will imply in one of the TAs going through (and possibly regrading) the entirety of the exam.

Office Hours

Office hours will be held virtually and/or in-person in the TA Office (Weber 116) or the Weber atrium. To make communications manageable with a large class, the instructors expect the students to ask general questions through the Piazza tab in Canvas and during lectures instead of sending direct emails and messages. Similarly, questions about the quizzes, homework, comprehensive exam, projects, or class logistics should be asked through Piazza.

Find our class signup link at: <https://piazza.com/gatech/fall2024/ae6343>

The TAs will hold office hours by appointment. Table 3 shows the links to the booking pages if you wish to book an office hour slot with the TAs and the time slot availability. Appointments can also be made via email with any of the TAs if the provided time slots don't work for you. However, if a private question must be asked, or you need something more reserved, a direct message such as an email is an appropriate alternative to attending office hours.

Table 3: TAs Availability & Booking Links

Link to the TA's Booking Page	Day & Time (EST)	Location
Balaji Ravikanti	To be determined	TA Office
Wiame Benzerhouni	To be determined	TA Office
Youssef Lamrini	To be determined	TA Office

Student Expectations

Lectures

Students are expected to participate in the lecture discussions and to ask questions whenever in doubt about class material. Lectures are performed in a discussion type atmosphere where consistent questioning of concepts takes place and student engagement is crucial.

Late Submission Policy

Assignments submitted late will be assessed a flat 20% penalty up to 7 days. Assignments not received after 7 days will receive a zero. For example, if a project receives 95/100, but was submitted within the availability of the assignment, it will receive 75/100. If an assignment is marked late on Canvas, it will be considered late.

Please note that there will be no extensions to the deadlines.

No Show Policy

Students in section A and B who do not take the quizzes or comprehensive exam in class will receive a 0, unless prior arrangements are made with the teaching staff.

Cheating

Cheating will not be tolerated in any of the assignments or exams. This is a rigorous program and you are expected to submit your own original work. Regular checks will be performed and perpetrators will be penalized with a letter grade deduction on their final grade of the course.

Use of Past Student Work

For individual assignments, students are not allowed use materials created by students who took the class in previous years just like they are not allowed to use materials created by their current classmates. Such actions go against the nature of an individual assignment and will be treated as a violation of Honor Code.

Usage of AI Tools

Students are not allowed to create text or code using generative machine learning models and services in any of their graded assignments. While automatic text generation could be used to get students out of writer's block, all text turned in for grading must be students' own work (*i.e.*, model-generated text must never be copied into documents to be turned in for grading). Similarly, students are free to use such tools to get started with their coding assignments or discover issues with their work. However, none of the auto-generated code

is allowed in the assignments that are turned in for grading. Furthermore, tools such as ChatGPT are not respectable sources and, if students use such tools during their research, statements must be backed up by real, referenceable, published work. If students have questions about the use of such tools, they must contact the instructors for clarifications and receive permissions for the use if they think it is legitimate. Any detection of unauthorized auto-generated text or code will be subject to penalties in accordance with institute policies established by the Office of Student Integrity. Finally, students are reminded that they are attending school to learn new skills and methods and they should focus on attaining them rather than looking for shortcuts that are easily noticeable and reflect badly on their work ethic.

Course Content and Schedule

The following is a list of topics approached by this course:

- Overview of design
- Systems engineering approach to design
- Requirements analysis
- Energy based constraint analysis
- Mission analysis for fixed wing vehicles
- Alternative energy vehicles
- Mission dependent constraint analysis
- Fundamentals of aerodynamics
- Fixed wing aircraft performance
- Aerospace Structures
- Fundamentals of air-breathing propulsion
- Airframe-engine integration

Georgia Tech School of Aerospace Engineering Values



1. **Honesty:** The School of Aerospace Engineering values honesty and integrity of all members of our community. An important element of this value is the academic honor code.

Georgia Tech Honor Challenge Statement: I commit to uphold the ideals of honor and integrity by refusing to betray the trust bestowed upon me as a member of the Georgia Tech community.

Honor Code: [Article I: Honor Agreement](#)

2. **Well Being:** The School of Aerospace Engineering values the complete well-being of all members of its community, which includes professional, physical, spiritual, emotional, and social dimensions. There are numerous resources to support the health and well-being of all members of our community: [Mental Health Resources](#)

Mental Health Resources:

- Emergencies: Can either Call 911 or call Campus Police at 404.894.2500 <http://www.police.gatech.edu/>
- Center for Assessment, Referral, and Ed. (CARE): 404.894.3498 (Counselor On-Call) <https://care.gatech.edu/>
- Counseling Center: 404.894.2575 <https://counseling.gatech.edu/>
- Stamps Health Services: 404.894.1420 <https://health.gatech.edu/>
- Student Life and Dean of Students: 404.894.6367 <https://studentlife.gatech.edu/content/get-help-now>

- Victim-Survivor Support (VOICE): 404-385-4464/(or 4451) <https://healthinitiatives.gatech.edu/well-being/voice>
- National Suicide Prevention Lifeline: 988 or 1.800.273.TALK (8255)
- Georgia Crisis and Access Line: 1.800.715.4225

COVID-19 Safety

GT Safety Guidelines: <https://health.gatech.edu/tech-moving-forward>

Current guidance is summarized at the site above and please continue to follow the site above and other Institute communications in case changes occur

3. **Social Justice:** The School of Aerospace Engineering values social justice for all members of the Georgia Tech community and the larger society. Social justice means that everyone's human rights are respected and protected. We stand committed in the fight against racism, discrimination, racial bias, and racial injustice. Our shared vision is one of social justice, opportunity, community, and equity. We believe that the diversity and contributions from all of our members are essential and make us who we are. We believe that our impact must reach beyond the classroom, research labs, our campus, and the technology we create, but must also improve the human condition where injustice lives. We will continue to work to understand, value, and celebrate all people and create an inclusive educational and work environment that welcomes all.

As a matter of policy, Georgia Tech is committed to equal opportunity, a culture of inclusion, and an environment free from discrimination and harassment in its educational programs and employment. Georgia Tech prohibits discrimination, including discriminatory harassment, on the basis of race, ethnicity, ancestry, color, religion, sex (including pregnancy), sexual orientation, gender identity, national origin, age, disability, genetics, or veteran status in its programs, activities, employment, and admissions. For more information, you can visit [this website](#).