

AE3030-C Syllabus

Aerodynamics, Section C, 4 credit hours

Fall 2026

Instructor Information

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General Course Information

Description

Aerodynamics of airfoils and wings in subsonic, transonic, and supersonic flight. Laminar and turbulent boundary layers and effects of viscosity on aerodynamic performance.

Objectives:

1. Learn how lift, drag and pitching moment are generated.
2. Learn airfoil and wing geometric parameters and aerodynamic performance characteristics (C_p , C_l , C_m , C_d , Drag Polar)
3. Learn similarity parameters, physical characteristics and aerodynamics trends associated with continuum flow regimes (Subsonic, Transonic, Supersonic, Hypersonic, Steady, Unsteady, Viscous, Inviscid)
4. Learn how the Potential Flow approach can be used to predict incompressible and compressible aerodynamics.
5. Learn the boundary-layer concept for modeling the effects of viscosity.
6. Be introduced to Non-Continuum Flows / Non-Newtonian Fluids
7. Be introduced to the Computational Fluid Dynamics (CFD) approach.

Course Learning Outcomes

Upon completion of the course, students should be able to:

1. Use analytical methods to estimate lift and drag (including viscous effects) on airfoils, wings and bodies of revolution in subsonic and supersonic flight.
 - o Thin Airfoil Theory, Finite Wing Theory, compressibility corrections, transonics, sweep effects, area rule, supersonic linearized theory, shock expansion wave method, Newtonian Theory, flat plate boundary layer

results in laminar/turbulent flow

2. Use numerical methods to calculate aerodynamic loads and moments (including viscous effects) on 2-D and 3-D bodies in incompressible and compressible flow
 - o Panel methods and integral boundary layer methods
3. Describe physical characteristics (including momentum and thermal) of laminar and turbulent boundary layers, transition, and separation.

Required Course Materials

Anderson, *Fundamentals of Aerodynamics* 5th ed. 2011 or later.

Grading Policy:

Test 1, 25% of grade

Test 2, 25% of grade

Final, 25% of grade

Average of homework assignments, 25% of grade

Description of Graded Components

Tests and Final: The tests and final will each consist of two parts. Part 1 will be a closed book section consisting of definitions and short answer questions to test your knowledge of course concepts. Part 2 will be a problem section where you will be able to use two 8.5 x 11 inch sheets front and back of notes and a calculator. You will be able to use your previous notes plus two additional sheets for each successive test and exam.

Homework: Approximately six homework assignments will be given with a due date. Homework turned in after the due date will incur a 15 point reduction. Homework will not be accepted after solutions are distributed.

Course Policies

Attendance and/or Participation

Attendance and participation in class is encouraged but not required. There is a recitation section associated with the class where help is available with concepts and problems.

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.

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

AE2010: Working knowledge of thermodynamics, isentropic flow and normal and oblique shocks.

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

As noted in the grading policies, late homework will have 15 points deducted.

If illness or scheduling issues arise with tests, please contact me as soon as possible to schedule a make up time to take the test.

Campus Resources for Students

Undergraduate Student Academic Success Resources:

- Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your

courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A [comprehensive list](#) of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being ([student-resource-guide \(gatech.edu\)](#))