Aerodynamics
EAS4101 Section#148B, Class ID 11701

Lecture Location and Time: FLG0220
Class Periods: MWF 3 (9:35 am to 10:25 am)
Academic Term: Fall 2025
It may become necessary to modify this syllabus during the semester.
In this event, students will be notified, and the revised syllabus will be posted on the course web site.

Instructor:
Bruce Carroll
Room 131 NEB
bfc@ufl.edu
352-392-4943 (office)
Office Hours: MWF 1:00 to 2:00 pm (held via Zoom**.)**
You can always contact the instructor to arrange Zoom meetings at other times.

Course Description
Incompressible aerodynamics, integral and differential governing equations, potential flow, boundary layers, airfoils, wings, numerical techniques. Credits: 3

Course Pre-Requisites / Co-Requisites
(EAS2011 or EAS3020C or EGN3353C) and COP2271; EML3100, MAC2313 and MAP2302 with minimum grades of C

Materials and Supply Fees
None

Course Objectives
The objective of the course is to introduce students to incompressible aerodynamics. Students will learn underlying theory derived from fundamental engineering science principles and will apply the theory to solve complex engineering problems using knowledge of mathematics and numerical techniques. In addition, students in this course will develop communication skills and continuing education skills. The objective will be achieved through:

- Class lectures and examples
- Group project
- Student completion of homework
- Student preparation for and completion of exams

Professional Component (ABET):
This course prepares graduates to have a knowledge of aerodynamics and to have design competence that integrates aeronautical topics.

Relation to Program Outcomes (ABET):

Outcome	**Coverage***
1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	
3) an ability to communicate effectively with a range of audiences	Low
4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Low

*Coverage is given as high, medium, or low. An empty box indicates outcome not significantly addressed by this course.

Required Textbooks and Software
Aerodynamics for Engineers, Bertin, J. and Cummings, R., Cambridge University Press, 2022, 6th Edition, ISBN 9781009098625

Additional Recommended Materials
- *Fundamentals of Aerodynamics*, John D. Anderson, Jr., McGraw-Hill, 2017, Sixth Edition,
- *Low Speed Aerodynamics from Wing Theory to Panel Methods,* Katz and Plotkin, McGraw-Hill, 1991.
- *Basic Aerodynamics: Incompressible Flow*, Gary Flandro, Howard McMahon and Robert Roach, 2012.

Required Computer:
It is important that you have your own computer. Details are provided on both the department and college websites:
- https://www.eng.ufl.edu/students/resources/computer-requirements/
- https://mae.ufl.edu/academics/prospective/undergraduate/computer-requirements/

Course Schedule
- See table at end of syllabus.

Important Dates
- Exam and Project Due dates are in table at end of syllabus

Attendance Policy, Class Expectations, and Make-Up Policy
Regular class attendance is expected as it will improve your performance in the course. Late HW and makeup exams are only allowed for students with documented circumstances consistent with UF policy. Students must contact the instructor as soon as possible to provide documentation and request a make-up exam. Excused absences must be consistent with university policies in the undergraduate catalog and require appropriate documentation. For more information on UF policies see https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

Evaluation of Grades
- Homework: Homework will be assigned periodically during the semester. Students must submit HW online by the due date to receive credit.
- Project: Students will work individually on the class project. The project must be submitted by the due date to receive credit.
- During Term Exams: Three exams will be given during regular class time.

Assignment	**Percentage of Final Grade**
Homework	10%
Project	15%
During Class Exams (3)	75%
No Final Exam	
	100%

Grading Policy

Percent	**Grade**	**Grade Points**
94 to 100	A	4.00
<94 to 90	A-	3.67
<90 to 87	B+	3.33
<87 to 84	B	3.00
<84 to 80	B-	2.67
<80 to 77	C+	2.33
<77 to 74	C	2.00
<74 to 70	C-	1.67
<70 to 67	D+	1.33
<67 to 64	D	1.00
<64 to 61	D-	0.67
<61 to 0	E	0.00

Academic Policies & Resources
To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: https://go.ufl.edu/syllabuspolicies. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment
The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:
• Your academic advisor or Undergraduate Coordinator

• HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
• Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu

			EAS4101 Aerodynamics -- Tentative Course Schedule Fall 2025
1	F	8/22	Lecture 1: Intro & Syllabus
2	M	8/25	Lecture 2: Basic Concepts, Fluid, Pressure, Standard Atmosphere, Viscosity, Speed of Sound, Continuum, Units
3	W	8/27	Lecture 3: Fundamentals of Fluid Mechanics, Frames of Reference, Conservation of Mass (differential and CV forms)
4	F	8/29	Lecture 4: Substantial Derivative, Conservation of Linear Momentum, Navier-Stokes Equations
	M	9/1	Holiday
5	W	9/3	Lecture 5: Examples – Linear Momentum Differential Form
6	F	9/5	Lecture 6: Linear Momentum in Control Volume Form
7	M	9/8	Lecture 7: Examples – Linear Momentum CV Form
8	W	9/10	Lecture 8: The Energy Equation, Euler's Equation and reduction to Bernoulli's Equation
9	F	9/12	Lecture 9: Flow Kinematics (This material is NOT in the textbook)
10	M	9/15	Lecture 10: Manometers and Airspeed Measurements
11	W	9/17	Lecture 11: Examples
12	F	9/19	Lecture 12: Examples and Review
13	M	9/22	**Exam 1 (material through section 3.4 in text)**
14	W	9/24	Lecture 13: Circulation, Stream Function, Velocity Potential
15	F	9/26	Lecture 14: Elementary Solutions to Laplace's Equation
16	M	9/29	Lecture 15: Elementary Solutions Part 2
17	W	10/1	Lecture 16: Lifting Flow over Cylinders
18	F	10/3	Lecture 17: Examples
19	M	10/6	Lecture 18: Viscous Flow Introduction
20	W	10/8	Lecture 19: Exact Solutions to NS Equations
21	F	10/10	Lecture 20: Boundary Layer Falkner-Skan Solution
22	M	10/13	Lecture 21: Incompressible Boundary Layers
23	W	10/15	Lecture 22: Incompressible Boundary Layers Continued
	F	10/17	Homecoming – No Class
24	M	10/20	**Exam 2 (material through section 4.4)**
25	W	10/22	Lecture 23: Introduction to Airfoils
26	F	10/24	Lecture 24: Thin Airfoil Theory
27	M	10/27	Lecture 25: Symmetric Thin Airfoils, Moment Coefficient, Center of Pressure
28	W	10/29	Lecture 26: Cambered Airfoil
29	F	10/31	Lecture 27: Examples and Biot-Savat Law
30	M	11/3	Lecture 28: Wings - Lifting Line Theory
31	W	11/5	Lecture 29: General Lift Distribution
32	F	11/7	Lecture 30: Example Lifting Line Theory
	M	11/10	Lecture 31: Elliptic Wings
33	W	11/12	Lecture 33: Panel Methods and Intro to xflr5
34	F	11/14	Lecture 34: Project Overview
35	M	11/17	Extra Day
36	W	11/19	Exam Review
37	F	11/21	**Exam 3: (material through Section 7.11)**
	M	11/24	Holiday
	W	11/26	Holiday
	F	11/28	Holiday
38	M	12/1	No Class (Project)
39	W	12/3	No Class - Project Due 11:59 pm
			No Final Exam