COURSE INFORMATION

Instructor	Professor Alexandra Le Moine (she/her/hers) alexandra.lemoine@colorado.edu Office: Aero N209
Teaching facilitators	Curtis Andrist Jacob Leonard Sadow Sadow Zachary Dyre
Office hours	See Canvas page for current information about office hours.
Lecture time & location	Monday and Wednesday, 3:00PM – 4:15PM in Aero 111

COURSE MATERIALS

Required textbooks	Cengel, Y., Cimbala, J., & Ghajar, A. (2021). *Fundamentals of thermal-fluid science*s (6th ed.). McGraw-Hill Education. Anderson, J., & Bowden, M. (2021). *Introduction to Flight* (9th ed.). McGraw-Hill Education.
Course website	Canvas Course Link
Course prerequisites	APPM 1350/1360, PHYS 1110 or equivalent
Course corequisites	APPM 2350 or equivalent, ASEN 2012

COURSE DESCRIPTION

- **Course purpose -** Introduce the fundamental concepts and principles of thermodynamic and fluid dynamic systems. The focus is on areas of general importance to the aerospace engineering discipline. The primary goal is the synthesis of basic science (physics), mathematics, experimental methods for quantitative analyses, and design of general aerospace technology systems.
- **Detailed course plan** – Available on Canvas (see Schedule).
- **Learning outcomes** - By the end of this course, you should be able to:

Thermodynamics

- Define the state of a pure substance and understand how to use property tables.
- State the 1st Law of Thermodynamics and define heat, work, and the difference between various forms of energy.
- Identify and describe energy exchanges processes (in terms of various forms of energy, heat, and work) in engineering systems.
- Apply the 1st Law of Thermodynamics to a closed system to estimate the required balances of heat and work.
- Apply the 1st Law of Thermodynamics to an open system to estimate the required balances of heat, work, and flow energy.

Aerodynamics

- Understand the elementary and fundamental concepts of aerodynamics.
- Apply Continuity, Euler's, Bernoulli's, and Energy Equations.
- Solve basic aerodynamic problems involving inviscid and viscous flow.
- Solve basic aerodynamic problems involving incompressible and compressible flow.
- Understand the fundamental concepts of aerodynamic bodies and two-dimensional lift and drag.

COURSE POLICIES AND PROCEDURES

I. STUDENT EXPECTATIONS

- Students are expected to actively engage with the course materials to maximize their learning experience. This includes:
    i. Performing practice problems assigned outside of class.
    ii. Actively participating during in-class activities.
    iii. Reading assigned textbook sections **before** coming to lecture.
    iv. Participating in class discussions to deepen understanding and apply concepts.
    v. Regularly attend office hours to ask topic-specific questions.
    vi. Performing all assigned assessments (e.g., homework, reading quizzes, and examinations).

- **Attendance** – Regular attendance is expected. Missing class may result in difficulty keeping up with the materials.

- **Students are expected to main certain levels of professionalism in the classroom.** This includes but is not limited to:

    i. Arriving to class prepared for the topic of discussion via completing all required reading assignments.
    ii. Arriving to class on time and notifying the professor if an early exit is required. (Professor Le Moine is an anxious person and gets worried when students rush out of lecture early!)

iii. Addressing the professor by their appropriate title (e.g., Professor Le Moine). Inappropriate titles include: “dude”, “bro!”, “prof”, “Ms./Mrs./Miss Le Moine”, “Alexandra”.
iv. Maintaining a respectful volume during lecture. It is understood that students will sometimes need to discuss topics with each other, but talking too loudly can be distracting to both the surrounding students and instructors.
v. Taking notes and paying attention to the lecture. Watching videos or playing a video game in class is rude. It is also unprofessional to keep headphones, earpods, or other listening devices on while in lecture.
vi. Respecting the classroom space.
vii. Respecting the communication platforms (Piazza, Canvas). These platforms should only be used to discuss relevant course related content. Any violation of this policy may result in disciplinary actions.

Any students violating these rules will be asked to leave the classroom and may be reported to the Student Code of Conduct.

II. INSTRUCTOR EXPECTATIONS

- You can expect your instructors to be courteous, punctual, well-organized, and prepared for lecture and other class activities; to answer questions clearly; to be available during office hours or to notify you beforehand if they are unable to keep them; to provide a suitable guest lecturer when they are traveling; and to grade uniformly and consistently according to the posted guidelines.

- You can expect the instructional team to reply to messages during regular business hours (i.e., Monday – Friday, (9:00 AM – 5:00 PM). Depending on the time of the semester, it may take the instructor up to 48 hours to reply to a message. ***Messages that are received 24 hours or less before an examination is not guaranteed a response***.

III. COMMUNICATION

- Communication of any medical or studies-related needs of absence that are known (non-emergency) should be communicated as soon as possible, and (when possible) any expected impact to assignments/exams should be coordinated with the instructor prior to, ***not after the fact***, of missing a course deadline. It should be noted that planned absences do not guarantee make up assignments and each situation will be considered on a case-by-case basis at the sole discretion of the instructor.

- Here is the general policy on communication:
  i. **Email** for personal scheduling issues only.
  ii. Use **Piazza** for course-related questions (link on Canvas page).
  iii. **Canvas** will not be used for direct communication.

- **Deadlines – Students are expected to communicate in a timely manner.** Student communication that occurs within 24 hours of homework, quiz, or exam deadlines are not guaranteed to be addressed.

- **Hours of Operation –** All correspondence to instructors and TFs will be handled during regular business hours: M-F 9:00 AM - 5:00 PM. Any messages sent to the instructional team outside these hours or during the weekend will go unanswered.

IV. HOMEWORK

- **Homework Format** – Homework assignments will be posted on Canvas. Students are encouraged to collaborate on homework assignments; however, each student must submit their own unique work, completed individually and written in their own handwriting. The written work must be uploaded to Gradescope as a PDF. The problems must be submitted in the same order as in the homework assignment and correctly labeled in Gradescope. Your name (last, first) and assignment number should be visible in the upper portion of each page. Each problem must begin on a new page and be clearly labeled. Final answers should be boxed in. **Ensure each problem follows the prescribed format exactly as outlined below to avoid deductions for incorrect formatting.**

  Problem Statement: Paraphrase the problem statement in your own words.
  Sketch: Draw a sketch of the system(s) and state(s) that are being considered.
  Givens: List and organize all the given information.
  Process/Assumptions: List any assumptions given in the problem statement.
  Relevant Equations: Write out the governing principles or equations required to solve the problem.
  Properties: Use property tables to list out required properties needed to perform analysis. Provide references for all tabulated data used.
  Analysis: Provide step-by-step procedure of your analysis. Include numerical values and units. Box in your final answer.
  Conclusion/Comments: Answer short answers for questions. Provide 1-2 sentences which comment on the reasonableness of your answer. Write down any observations you have regarding your final answer(s).

- **Late Homework –** No homework submissions will be accepted after the assignment is due unless extenuating circumstances prevented timely submission of the homework. This will be considered on a case-by-case basis and is at the sole discretion of the instructor. **Absolutely no homework submissions will be accepted once solutions to the assignment have been posted**. Late submissions close to the deadline may encounter issues with Gradescope, and these are not the responsibility of the instructor. Please submit your work well before the deadline to avoid potential technical issues

- **Homework Solutions –** Complete homework solutions will be posted to Canvas shortly after the assignment is due.

V. READING QUIZZES

- **Reading quizzes –** There will be weekly reading quizzes based on the previous week's reading assignments that will be taken online via Canvas. The window to take the online reading quiz will open at 12:00AM on Friday morning and will close at 11:59 PM on Friday evening. Students may take the quiz at any time during this 24-hour period. Once the quiz is started, students will have 10 minutes to complete the quiz.

- **Missed reading quizzes –** There will be no make-up reading quizzes. The lowest reading quiz grade will be dropped.

VI. EXAMS

- There will be four in-person 75-minute exams during the semester. The first two 75-minute exams will comprehensively cover the thermodynamics topics. The last two 75-minute exams will comprehensively cover the aerodynamic topics. Three exams will be taken during regular lecture, and the fourth exam will be taken during the final exam period. *All exams will be closed-book and closed-notes with an equation sheet and property tables provided. Calculators are allowed on all exams.*

- **Exam Materials –** All exams will be **closed-book** and **closed-notes** with an equation sheet and property tables provided. Calculators are allowed on all exams.

- **Missed Exams** – There will be no make-up exams unless extenuating circumstances caused the student to miss the exam. This will be considered on a case-by-case basis and is at the sole discretion of the instructor.

- **Accommodations –** We schedule a separate room, or rooms, based on accommodation needs to take the exams. **Students should expect to receive accommodations for a timed assessment (e.g., exam) only if their faculty instructor(s) receive the student's accommodations letter at least 5 business days before the assessment, as a departmental policy, in order to facilitate administering the assessment**. We cannot accept an unofficial accommodation letter from Disability Services.

VII. ASSESSMENT REGRADE REQUESTS

If you believe an error was made in grading your homework or exam, you may make a formal regrade request via Gradescope within 1 week of the graded assignment return date. All regrade requests will be reviewed and approved by a course instructor. Regrade requests will not be considered once this 1-week window has passed.

- Submit regrade requests via Gradescope. Include a clear, concise explanation of your request; overly long or vague requests may be denied.

- To ensure fairness and professionalism, regrade requests must be written respectfully. Please keep explanations concise and constructive.

- Disagreement on the established rubric allocation of points will not be considered. Any regrade request arguing the fairness of point allocations via the grading rubric will be immediately denied.

- **Caution about using regrade requests!** Points can be added OR removed based on correctness. If a mistake was made in grading and too few points were awarded, the regrade request may increase the final score. If the professor finds a mistake was made in grading

and too many points were awarded, then the regrade request may lower the final score.

VIII. CALCULATION OF COURSE GRADE

Grades for this course will be assigned based on the following weighted breakdown:

Assessment	Weight
Reading Quizzes	5%
Homework	15%
Exam 1 (Thermodynamics)	20%
Exam 2 (Thermodynamics)	20%
Exam 3 (Aerodynamics)	20%
Exam 4 (Aerodynamics)	20%

Course grade determinations are absolute and requests for makeup work, submissions of late assignments, or other general exceptions will not be considered. Letter grades are determined from the following table:

Letter Grade	Percent Grade	4.00 Scale
A	93.00 - 100.00	4.00
A-	90.00 - 92.99	3.67
B+	87.00 - 89.99	3.33
B	83.00 - 86.99	3.00
B-	80.00 - 82.99	2.67
C+	77.00 - 79.99	2.33
C	73.00 - 76.99	2.00
C-	70.00 - 72.99	1.67
D+	67.00 - 69.99	1.33
D	63.00 - 66.99	1.00
D-	60.00 - 62.99	0.67
F	Below 60.00	0.00

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IX. MAKEUP WORK / EXTRA CREDIT

The instructor does not offer makeup work or extra credit. Any requests for such items will be ignored.

CU BOULDER POLICIES

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat,

unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part in adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Visit Honor Code for more information on the academic integrity policy.

Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or DSinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

If you have a temporary illness, injury or required medical isolation for which you require adjustment, you must alert you professor immediately via email per the communications policy listed in section III.

Accommodation for Religious Obligations

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please communicate the need for a religious accommodation in a timely manner. In this class, you must alert your professor immediately via email per the communications policy listed in section III. See the campus policy regarding religious observances for full details.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

For more information, see the classroom behavior policy, the Student Code of Conduct, and the Office of Institutional Equity and Compliance.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits protected-class discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email CUreport@colorado.edu. Information about university policies, reporting options, and OIEC support resources including confidential services can be found on the OIEC website.

Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure that individuals impacted receive outreach from OIEC about their options and support resources. To learn more about reporting and support for a variety of concerns, visit the Don't Ignore It page.

Mental Health and Wellness

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact Counseling and Psychiatric Services (CAPS) located in C4C or call (303) 492-2277, 24/7.

Free and unlimited telehealth is also available through Academic Live Care. The Academic Live Care site also provides information about additional wellness services on campus that are available to students.