

**ASEN 2002**  
**Introduction to Thermodynamics and Aerodynamics**  
**Fall 2019**

**Lecture: AERO 120**      T/Th 11:30 am – 12:45 pm (*Section 100*)  
   T/Th 01:00 pm – 02:15 pm (*Section 200*)  
**Lab: PILOT**                    M/W 8:30-10:20 am (*Section 303*)  
   M/W 10:30-12:20 am (*Section 301*)

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**Office Hours: TBD**

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**Class Canvas Portal** <https://cuboulder.instructure.com/courses/54087>

**Texts:** Cengel, Fundamentals of Thermal-Fluid Sciences, 5th Edition.

Anderson, Introduction to Flight, 8<sup>th</sup> Ed. 2016 (hardcopy or elec (t)-1.1 (ur)-6.4 (e) (-)-1.1 (5t)-1.1 (h)-m6.4 (od)-12.3eE

that lab notebooks will be required for Sr. Projects, as well as good professional practice, so use this opportunity to establish a good habit).

**Course Objective:** Introduce the fundamental concepts and principles of thermodynamic and fluid dynamic systems. The focus is in areas of general importance to the aerospace engineering discipline. The primary goal is the synthesis of basic science (physics), mathematics, experimental methods for quantitative and qualitative analyses and design of general aerospace technology systems.

**Topical Outline:**

1. Basic concepts of thermodynamics
2. Conservation of energy: the First Law of Thermodynamics
3. Properties of pure substances
4. Control Volume Analysis
5. Introduction to basic concepts of aerodynamics
6. One-dimensional incompressible flows
7. One-dimensional compressible flows
8. Two-dimensional flows: lift and drag
9. Introduction to viscous flows

**Grading**

Evaluated Outcomes

The Department of Aerospace Engineering Sciences has adopted a policy of assigning grades according to “evaluated outcomes” in each course:

- O1** Professional context and expectations (ethics, economics, business environment, etc.)
- O2** Current and historical perspective
- O3** Multidisciplinary, systems perspective
- O4** Written, oral, graphical communication ability
- O5** Knowledge of key scientific/engineering concepts
- O6** Ability to define and conduct experiments, use instrumentation
- O7** Ability to learn independently, find information
- O8** Ability to work in teams
- O9** Ability to design
- O10** Ability to formulate and solve problems
- O11** Ability to use and program computers

Evaluation of these outcomes allows an assessment of your performance and provides a major portion of the process we use for continuous assessment and improvement of the entire AES undergraduate curriculum. The model for these outcomes derives from several sources including the “*Desired Attributes of an Engineer*” as defined by The Boeing Company, and “curriculum reviews” from major aerospace corporations including The Boeing Co., Lockheed Martin Corp. and Ball Aerospace Corp. These inputs were combined with the AES faculty vision of the desired attributes of an aerospace engineer and the requirements of the Accreditation Board for Engineering and Technology (ABET) to produce this list of evaluated outcomes. Each assignment designed and graded to assess some combination of these outcomes.

**Grade Breakdown:** The two principal lecture and lab sections of the course, *thermodynamics and aerodynamics*, are equally weighted. Your final grade is determined according to the following percentage breakdown.

10%

<b>Type</b>	<b>Description</b>	<b>Percentage</b>
<b>Individual</b>	Quizzes	10%
	4x Exams	50%
	<i>Thermo Exam 1</i>	<i>10%</i>
	<i>Thermo Exam 2</i>	<i>15%</i>
	<i>Aero Exam 1</i>	<i>10%</i>
	<i>Aero Exam 2</i>	<i>15%</i>

time with a functioning clicker! If you must miss class for an excused absence, you may submit your homework early. Late homework submittals are not accepted.

3. In the case of homework, laboratory report

- For every exam, a random sampling of exams will be scanned and saved. *DO NOT ALTER*

20. Use of electronics in the classroom aside from taking notes is strongly discouraged.

21. Professional behavior and considerate communication practices are expected at all times. Any questions, comments or concerns you may have should be respectfully voiced to your peers or the professor either in person or via email.

**ACCOMMODATION FOR DISABILITIES**

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

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assignments or required attendance. See the campus policy regarding religious observances for full details.