ASEN 3113: Thermodynamics and Heat Transfer, Spring 2022

Lecture Time:	Section 010 – Tuesday/Thursday 4–5:15pm (AERO 120)
Lab Time/Location:	Section 011 - Thursday 10:35am–12:25pm (AERO N100) Section 012 - Friday 10:35am–12:25pm (AERO 141)

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Note: Office hours will be posted at Canvas.

Textbook: **McGraw-Hill Education:** Cengel, Cimbala, and Turner, *Fundamentals of Thermal-Fluid Sciences, 5th Edition*.

Prerequisites: ASEN 2002 or equivalent.

Introduction: This course follows ASEN 2002 and covers the Second Law of Thermodynamics, Entropy, Power/Energy Cycles and Heat Transfer (conduction, convection, and radiation). The emphasis will be on understanding the basic physical principles associated with these topics and developing the student's ability to solve numerical problems associated with them. Experiments will be carried out to help the students gain experience with the systems representing these principles. The course will also cover briefly the kinetic theory of molecules, introducing students to the basic microphysics underlying thermodynamics and to several basic but very important statistical distributions that have found wide applications in scientific research.

Course Objective: Given regular class attendance, reading of assigned text material in preparation for quizzes, careful and comprehensive completion of all assignments, students should be able to: (1) understand the general concepts of thermodynamics and heat transfer in order to develop an intuitive grasp of the subject matter; (2) develop an ability to apply these basic concepts to engineering design problems.

Course Structure: The textbook will be followed closely but some additional material may be introduced to broaden a particular subject. This material will be distributed to the class. Students are expected to read the assigned textbook section in time to prepare for both in class discussion and for quizzes given approximately every week. Homework assignments will be weekly or bi-weekly.

Exams: There will be three mid-term exams and a final exam. All mid-term exams will be in-class and cover the materials between it and the previous exam. All exams are closed book. However, for mid-term exams 1, 2, 3 and the final exam you are allowed to have quantity of 1, 2, 3, and then 4 single-sided 8.5x11 pages of crib notes, respectively, meaning 1-page crib notes accumulatively for each exam. Always bring a calculator. Thermodynamic Tables will be provided to you for the exams. There will be no make-up opportunity for quizzes since the lowest three will be dropped. Make ups for exams are extremely difficult to accommodate. There will be no unexcused exam makeups provided. If you miss an exam, the course instructor will evaluate each case on an individual basis based on the context and information available to decide if a makeup exam will be provided. Students are encouraged to provide as much documentation as possible to enable an informed decision. If necessary, the instructor may choose to use your existing grades to cover your missed grade(s).

GRADING

Our grading scheme is designed to indicate your level of competency compared to the standards set by the AES faculty. Do you meet the minimum level of competency? Do

you exceed the minimum? Are you below the minimum? This should be indicated by the final grade. We (the faculty) are professionals and it is our job to set and maintain standards. We are expected to use our educations, experiences, and interactions with industry, government laboratories, others in academia, etc., to determine the contents of these standards. Because our program is accredited by ABET (Accreditation Board for Engineering and Technology), the AES curriculum meets or exceeds that board's standards. As with any other professionals (doctors, lawyers, etc.) you must trust that we know what we are doing and that we are obliged to uphold standards.

The final grade indicates your readiness to continue to the next level of courses. Meeting the minimum requirements indicates that you are prepared to continue, at least at the minimum level required for the next sequence of courses. Exceeding the minimum means you are ready to enter the next course and that you have mastery of material beyond the minimum, i.e., you show some level of proficiency.

Grade Breakdown According to Assignments: Your final grade is determined according to the following percentage breakdown:

Reading/lecture Quizzes (~10 min each; drop the lowest three)	10%
Three Mid-term Exams (8% each)	24%
Experimental Labs (2 reports, 10% each) (Group efforts)*	20%
Design Lab (1 pptx presentation) (Group efforts)*	8%
Homework (Group efforts)*	15%
Final Exam (7:30-10pm, May 3, 2022, Tuesday)	23%
Overall	100%

*Group efforts are counted toward the final grade only if the total individual grade is C or better.

Any grade question/dispute must be resolved **within two weeks** after the grade is posted. This will avoid undue complications at the end of the semester when final grades are being determined. As for the final exam and final grade, any question/dispute will be resolved at the beginning of the next semester (**not during the break**). There are certain due processes to be followed.

Important Notes

1. We reserve the right to reply to email questions only in business hours, i.e., Monday through Friday, 9:00 am – 6:00 pm. Emails received 24 hours or less before the exams are not guaranteed a response. We also reserve the right to reply all (to the entire class) if the questions/answers are deemed to benefit others in the class (the identities of the questioners are not to be revealed). To better help us manage and track your emails, from the junk and clutter that we receive on a daily basis, please include **ASEN3113** at the beginning of the subject line.

2. The scheduled laboratory hours will be used for both experimental and design lab projects. These lab hours should be used for course work even when no formal supervision is present.

3. Attendance in person to all lectures and laboratory workshops is expected.

4. Participation in and contributions to the team laboratory assignments are expected.

5. Always have a calculator for both lecture/laboratory sessions.

6. Expect new material to be presented in both the "lectures" and the "laboratory" hours.

7. Why do we have reading assignments, homework, lab assignments, design project, and various quizzes?

- Reading assignments are to be completed before the lecture/discussion. The lecture/discussions should help clarify and supplement what you have read.
- Homework assignments will cover both material from lectures and material assigned but not covered in lectures. Homework enforces the mental processes that help you to become proficient in a subject. In addition, homework may encourage you to learn other material not included in lectures or laboratories.

  HW(Score/30) = 10pts (random P1) + 10pts (random P2) + 10pts (# of remaining problems completed)/(# of remaining problems assigned)

- Experimental laboratory assignments are either more complex than hands-on homework or require special equipment. You will work in teams and are required to submit a team laboratory report and one page or less your individual discussion about the lab.
- Design project helps you to learn how to synthesis the basic concepts, methods, and tools presented in the course curriculum. The team-oriented approach will give you experience in working and cooperating in groups.
- Reading and lecture quizzes provide a gauge to determine what you have learned independently from the assigned reading, and test how much you have learned from lectures on the previous days and/or the current day.

8. Quizzes will be conducted on Canvas regardless remote or in-person teaching mode. Students will **take quizzes on their own time after lecture X but before lecture X+1**. **Once a quiz is started, students have 10 minutes or other specified time (between 10 and 20 minutes) to finish it**.

9. **All assignments must be submitted to Canvas in pdf form only:**

- Homework must be submitted before class begins on the day that it is due.
- Pre-lab and Experimental Lab Reports must be submitted before lab begins on the day that it is due.

All individual submissions must follow the convention:
LastName, FirstName_AssignmentName, for example: Smith, John_HW1

For group Exp Lab Report submission, please follow the convention:
Lab#_Group#_Thu or Lab#_Group#_Fri

10. Always submit work in a professional form. Neatness, clarity, and completeness count. **If submitted work is not legible, you may not receive full credit. Please review before and after submitting. It is your responsibility to make sure the submission is complete.**

11. Late submissions will not be accepted. If you know in advance that you must miss a homework due date or lab for a legitimate reason, send the relevant Instructors/TA/TFs an e-mail to make an exception and special arrangements. We expect students to be professional by attending class and submitting assignments on time. Students who were impacted by the Boulder County fires (on 30 Dec 2021) please contact a teaching team member or Professor ahead of time to let us know of any accommodations or extensions needed.

12. Collaboration is permitted on homework. This means you may discuss the means and methods for solving problems even compare answers, but you are not free to copy someone's assignment. The work that you turn in must be your own--copying is not allowed for any assignments. Collaboration on quizzes and exams, or using another student's work or allowing another student to use your work is academic misconduct.

13. This class is not graded on a curve; there are absolute expectations of performance. However, we reserve the right to normalize and adjust the class grades based on the highest performance in the class. This process will not lower a person's grade.

In order to continue on ASEN core courses, a minimum grade of C is required.

Other Important Notes

Classroom Behavior

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail 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, political affiliation or political philosophy. For more information, see the policies on classroom behavior and the Student Conduct & Conflict Resolution policies.

Requirements for Combating COVID-19

As a matter of public health and safety due to the pandemic, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. Students who fail to adhere to these requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Conflict Resolution. For more information, see the policy on classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus. As of January 10, 2022, CU Boulder is teaching in remote mode for the first two weeks, and whether to return to in-person teaching will be determined later. When the class returns to in-person teaching, we must follow the all university, department and building rules for combating the spread of COVID-19 virus, e.g., wearing masks in classrooms and laboratories regardless of vaccination status. Exemptions include individuals who cannot medically tolerate a face covering, as well as those who are hearing-impaired or otherwise disabled or who are communicating with someone who is hearing-impaired or otherwise disabled and where the ability to see the mouth is essential to communication. If you qualify for a mask-related accommodation, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus. In addition, vaccinated instructional faculty who are engaged in an indoor instructional activity and are separated by at least 6 feet from the nearest person are exempt from wearing masks if they so choose.

Students who have tested positive for COVID-19, have symptoms of COVID-19, or have had close contact with someone who has tested positive for or had symptoms of COVID-19 must stay home.

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 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.

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.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code academic integrity policy. Violations of the Honor Code may include, but are not limited to: plagiarism, 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. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the Honor Code website.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to fostering an inclusive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (harassment, exploitation, and assault), intimate partner violence (dating or domestic violence), stalking, or protected-class discrimination or harassment by or against members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or email cureport@colorado.edu. Information about OIEC, university policies, reporting options, and the campus resources can be found on the OIEC website.

Please know that faculty and graduate instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, dating and domestic violence, stalking, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about their rights, support resources, and reporting options.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance.
See the campus policy regarding religious observances for full details.