

ASEN 3113: Thermodynamics and Heat Transfer, Fall 2022

Lecture Time/Location: Section 010 - M/W/F 12:50 pm - 1:40 pm AERO 120

Lab Time/Location: Section 011 - Mon 08:30 am - 10:20 am AERO 141
Section 012 - Mon 10:30 am - 12:20 pm AERO 141
Section 013 - Fri 08:30 am - 10:20 am AERO N100

Instructor:

Prof. Xinlin Li

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Office Hours: 5:30-6:30 PM on Tu (Zoom:)

8:30-9:30 AM and 10:30-11:30 AM on Mon (AERO 141),
and 8:30-9:30AM on Fri (AERO N100)

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Text: McGraw Hill Connect: Cengel, *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 student gain experience with the systems representing these principles.

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.

This class utilizes the iClicker system to enhance learning and reward participation in class discussion. You will need to have an iClicker student app account, [register your clicker there](#), and download and set up the app **BEFORE** you get to class. For more information:
<https://oit.colorado.edu/services/learning-spaces-technology/clickers/help/student-resources>

Exams: There will be 3 50-minute-long mid-term exams and a final exam. All mid-term exams will be in-class and cover the material between it and the previous exam. All Exams are close book but you are allowed to have one single-sided 8.5x11 page crib notes for your first exam, and you are allowed to fill out the other side of the same crib sheet for your second exam, and so on. Always bring a calculator. Thermodynamic Tables will be provided to you for the exams. There will be no make-up for exams (and

quizzes). **Acceptable excuses**, such as a medical emergency (There will be no make-up opportunity for quizzes since the lowest three are dropped).

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 education, experience, and interactions with industry, government laboratories, others in academe, etc., to determine the content 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 3)	5%
Clicker quizzes (random; drop the lowest 3)	5%
Three Mid-term Exams (8% each)	24%
Experimental Labs (2 reports, 10% each) (Group effort)*	20%
Design Lab (1 power point presentation) (Group effort)*	8%
Homework (Group effort)*	15%
Final (TBD)	23%
	100%

*Group effort only counts toward final grade if 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 first week 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, 8:00 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. Always have a calculator for both lecture/laboratory sessions.
5. Expect new material to be presented in both the "lectures" and the "laboratory" hours.
6. Why have reading assignments, homework, lab exercises, design project, and various quizzes?

- Reading assignments are to be completed before the lecture/discussion. The lecture/discussions should help to 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.

$$HW(\text{Score}/30) = 10\text{pts (random P1)} + 10\text{pts (random P2)} + 10\text{pts (\# of remaining problems completed)/(\# of remaining problems assigned)}$$

- Experimental laboratory exercises 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 quizzes at the beginning of class provide a gauge to determine what you have learned independently from the assigned reading. Lecture quizzes, at the end of class, cover the previous days' and/or the same day's lecture. Clicker quizzes, another way to measure what you have learned, increase your retention what was taught, and facilitate discussion and peering teaching. Always bring your iClicker to the classroom.

7. 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 typed and** 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

8. 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.

9. Late assignments will not be accepted. If you know in advance that you must miss a homework due date or lab, send the relevant Instructors/TA/TFs an e-mail to make arrangements. We expect students to be professional by attending class and submitting assignments on time.

10. 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.

11. 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 [classroom behavior](#) policy, the [Student Code of Conduct](#), and the [Office of Institutional Equity and Compliance](#).

Requirements for COVID-19

As a matter of public health and safety, 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. CU Boulder currently requires COVID-19 vaccination and boosters for all faculty, staff and students. Students, faculty and staff must upload proof of vaccination and boosters or file for an exemption based on medical, ethical or moral grounds through the MyCUHealth portal.

The CU Boulder campus is currently mask-optional. However, if public health conditions change and masks are again required in classrooms, students who fail to adhere to masking 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.

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). {Faculty: insert your procedure here for students to alert you about absence due to illness or quarantine. Because of FERPA student privacy laws, do not require students to state the nature of their illness when alerting you. Do not require "doctor's notes" for classes missed due to illness; campus health services no longer provide "doctor's notes" or appointment verifications.}

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](#). 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 Student Conduct & Conflict Resolution (honor@colorado.edu); 303-492-5550). 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. 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

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

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of any issues related to these policies regardless of when or where they occurred to ensure that individuals impacted receive information about their rights, support resources, and resolution options. To learn more about reporting and support options for a variety of concerns, visit [Don't Ignore It](#).

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. In this class, students need to inform the instructor in advance if they need accommodation. See the [campus policy regarding religious observances](#) for full details.