

ASEN 3113 – Thermodynamics and Heat Transfer

Course Syllabus, Spring 2023

LECTURE INSTRUCTOR

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OFFICE HOURS AND CONTACT INFORMATION

Zoom/Hybrid Office Hours: Tuesday and Thursday 3pm to 4pm

In-Person Office Location: AERO 369

Zoom Virtual Office Link:

Email: hisham.ali@colorado.edu

Email Policy: It is our intent to make ourselves as accessible as possible to you during this semester within the bounds of other responsibilities. In general, we will do my best to accommodate student needs and respond as promptly as possible to e-mails. In your email, please identify yourself by providing the course number (**ASEN 3113**) in the subject line and your name at the start of the message. However, all technical questions on course content should be asked during lecture, office hours, or on the course Slack Workspace. One-on-one meetings with the instructor will only be scheduled to address individual administrative or academic issues.

COURSE SCHEDULE, LOCATION, AND LINKS

Lecture Time and Location: All lectures will be held in AERO 120 at the following times

- **ASEN 3113 Section 010:** 4:00 PM – 5:15 PM, Tuesday and Thursday, AERO 120

Lab Times and Location:

- **ASEN 3113 Section 011:** Tuesday 10:35 AM – 12:25 PM – AERO 141 (PILOT)
- **ASEN 3113 Section 012:** Tuesday 12:40 PM – 2:30 PM – AERO 141 (PILOT)
- **ASEN 3113 Section 013:** Wednesday 12:50 PM – 2:45 PM – AERO N100 (COPILOT)

Course Links:

- **Website Link:** <https://canvas.colorado.edu/courses/92259>
- **Slack Link:** (An invitation link will be sent via Canvas)

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COURSE OVERVIEW

Course 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 Reading and Assignments: 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.

Course Quizzes: 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. Quizzes cover previous lectures and reading assignments.

Course 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).

Course Schedule: The specific weekly course schedule (lectures, exams, assignments) will be posted to Canvas.

COURSE TEXTBOOK AND PREREQUISITES

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

Course Pre-Requisites: ASEN 2002 or equivalent

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COURSE GRADING AND POLICIES

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, 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. This course consists of several graded components, with your final grade determined by the following breakdown:

Grading Breakdown:

Reading/Lecture Quizzes (~10 min each; drop the lowest 3)	10%
Three Midterm Exams (8% each)	24%
Experimental Labs (2 reports, 10% each, group effort*)	20%
Design Lab (1 presentation, group effort*)	8%
Homework (group efforts*)	15%
Final Exam (1:30 – 4pm, Monday, May 8 th , 2023)	23%
Total	100%

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

Grading Notes:

- 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.
- 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.

General Policies:

- 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.
- Attendance in person to all lectures and laboratory workshops is expected. Participation in and contributions to the team laboratory assignments are expected.
- Always have a calculator for both lecture and laboratory sessions.
- Expect new material to be presented in both the "lectures" and the "laboratory" hours.

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Assignment Policies:

- All assignments will be submitted through GradeScope or Canvas in an appropriate format (PDF, .m, etc.)
- Homework must be submitted before the due date and time. 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 experimental lab report submission, please follow the convention: Lab#_Group#_Sec# or Lab#_Group#_Sec#
- 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.
- 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.

Collaboration Policy: 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.

Slack Policy: To help better facilitate communication a Slack Workspace has been set-up for this course. An invitation link will be posted as a Canvas announcement. You must sign in with your CU email address (@colorado.edu) to be successfully added to the workspace. Please note that you are not required to use Slack and all course wide notifications will still be sent out via the course webpage. This tool is primarily to improve communication and collaboration within the course. Please note that while the Instructor and Teaching Assistant aim to regularly monitor the Slack Workspace, you should not expect communication outside of business hours.

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.

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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). Please alert the course instructors via email as soon as possible about any absences due to illness or quarantine.

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.

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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 concerns, 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. See the [campus policy regarding religious observances](#) for full details.