ME3322B – Engineering Thermodynamics
Fall 2026
Monday/Wednesday 2:00 pm – 3:15 pm, Kendeda Bldg | Room 210

Description: Introduction to thermodynamics. Thermodynamic properties, energy and mass conservation, entropy and the second law. Second-law analysis of thermodynamic systems, gas cycles, vapor cycles.
Prerequisites: PHYS 2211 or 2231 & MATH 24X3 or 25X2
Textbook: *Fundamentals of Engineering Thermodynamics by Moran et al., zyBook Ed.*
Instructor: Prof. Nazanin Bassiri-Gharb, Email: nazanin.bassirigharb@me.gatech.edu

Office Hours: TBD
Grader: TBD
Recitation: TBD
Any changes will be updated directly on Canvas.

Tutoring resources:
In-person Shell tutoring are available on Mondays and Wednesdays from 6-8 PM on the 4th floor of MRDC
Virtual Knack tutoring: https://www.joinknack.com/school/georgia-institute-of-technology
Additional tutoring service are available from Georgia Tech. The information for Spring 2026 will be made available at: https://www.me.gatech.edu/tutoring-0

Homework: 9 assignments, all due before the start of the due-date class.

No late homework will be accepted without prior approval. If you know you will be unable to return the HW in time, please contact me in advance and turn in your HW beforehand. If it is an emergency, please communicate with me and the office of Dean of Students ASAP.

Test and Exam Schedule:
Midterm exam #1: TBD
Midterm exam #2: TBD
Final Exam: follows GT exam calendar

Use of electronic material and devices during the exams is not allowed. Steam tables will be provided for the tests and exams and will be the only material allowed during the exam.

The use of cell phones, tablets, smart glasses, smart watches, is **NOT** allowed for exams.

Percentage for Grade Calculation:
- Attendance and participation: 5%
- Homework: 15%
- **Either** Two Midterms at 40% of Course Grade Each
  OR Midterm 1: 20%; Midterm 2: 25%; Final: 35%
  If you do take the final, the grade will be calculated using the Midterm 1 at 20%, Midterm 2 at 25%, and Final counting towards 35% of your final class grade.

Grades will follow the usual scale* A>90, B=89-80, C=79-70, D=69-60, F<60.
*In exceptional cases, I reserve the right to adjust the grade cutoff in the student's favor, but this is highly unlikely.

A Note about Midterms and Final: The midterms will focus on material covered since the previous midterm, but concepts are cumulative and, therefore, exams utilize concepts covered previously. The midterms meet for the full class period in the regular classroom. The final follows the exam schedule provided by the Institute and meets in the regular classroom, at the date and times indicated online.

Bring with you:

1) The bound Property Booklet consisting of tables and appendices from the zyBook
2) Calculator, pencil, and eraser

An equation-sheet (see a copy on Canvas) will be provided for you to use for each exam.

Bonus points: I might assign additional problems and activities during a lecture. These have often a single (1) grade point associated each and will be due at the beginning of the lecture immediately following the assignment. These bonus assignments are in addition to all other grades acquired through regular HW, tests and exams, and thus can be used towards missed HW or attendance and participation.

Attendance: To be successful, I strongly recommend that you follow the class lectures and keep up with the course as we progress.

Participation will be considered through participation in class discussions, while attendance will be recorded through specific activities. Reading activities online through zyBooks are highly recommended regardless of the possible grade assigned.

How to Succeed in this Course:

- Be active: come to the lectures, ask questions and answer them for others on Canvas discussion board.
- Study a minimum of 7-8 hours per week:
  - Three (3) hours for reviewing the lectures, eventually correct your notes, read through the book, and review your own understanding of the material
  - One (1) hour to study solved text examples from our book or any other thermodynamics reference book,
  - Three (3) hours for homework AND additional problems from textbook
- You should be working on homework every day of the week; do not try to solve all the assigned problems the evening before they are due; you cannot learn the material well by cramming. If you get behind, you will have difficulty on the tests and exams.
- I strongly recommend against simply looking at solution of problems we have done or the homework solutions to get ready for the exams. Thermodynamics is a deceptively easy class: the solutions are always easy but the challenge is in you setting up and solving the problems on your own and finding the right way to do so (engineering assumptions and correct equations to use) is really the critical thinking you are supposed to learn in this class.

Course Topics:

Part I
- Conservation of mass, conservation of energy, 1st Law of Thermodynamics
- Definition of property, state; isolated, closed and open systems; work interactions and heat transfer
- Forms of energy and energy transfer: kinetic, potential, internal, work, & heat

Part II
- 2nd Law of Thermodynamics, Kelvin-Planck and Clausius

statements, Clausius inequality, entropy, and TdS relations
- 2nd law analysis, irreversibility for open, closed and isolated systems

Part III
- Properties of pure substances, equilibrium diagrams, quality, ideal gas and incompressible substance treatments
- Air standard cycle, Otto, diesel, Brayton, Stirling, Rankine, Carnot, regeneration, intercooling and reheating, component efficiencies.

Course Objective:

Students will demonstrate the ability to:

- practice basic principles of thermodynamics including:
  - conservation of mass, conservation of energy, and the 2nd law of thermodynamics
  - work interaction and heat transfer
  - thermodynamic properties of compressible substances
- formulate and solve engineering problems involving both steady-state and transient processes in open and closed systems through determining thermodynamic properties.
- perform 2nd law analysis on thermodynamic systems including concepts of
- perform power and refrigeration/heat pump analysis of

ABET Course Outcomes:

Outcome 1: To teach students the basic principles of classical thermodynamics.

1.1 Students will demonstrate an understanding of the concepts of conservation of mass, conservation of energy, and the second law of thermodynamics.

1.2 Students will demonstrate an understanding of the concepts of work interaction and heat transfer.

1.3 Students will demonstrate an understanding of methods for determining thermodynamic properties of simple compressible substances, incompressible substances, and ideal gases.

Outcome 2: To train students to identify, formulate, and solve engineering problems in classical thermodynamics involving closed and open systems for both steady state and transient processes.

2.1 Students will demonstrate the ability to identify closed and open systems.

2.2 Students will demonstrate the ability to identify work interactions and heat transfer.

2.3 Students will demonstrate the ability to determine accurately the thermodynamic properties of simple compressible substances, incompressible substances, and ideal gases.

2.4 Students will demonstrate that they can apply the principles of conservation of mass and energy to the solution of problems.

Outcome 3: To train students in the application of a second law analysis to a thermodynamic system.

3.1 Students will demonstrate an understanding of the concepts of the second law including entropy, irreversibility, and the isentropic efficiency.

3.2 Students will demonstrate that they can apply a second law analysis to the solution of problems involving closed and open systems for both steady and transient processes.

Outcome 4: To train students to analyze the performance of power, refrigeration, and heat pump cycles.

4.1 Students will demonstrate that they can apply the principles of conservation of mass, conservation of energy, and the second law of thermodynamics to thermodynamic cycles.

4.2 Students will demonstrate the ability to analyze the performance of vapor and gas power cycles.
4.3 Students will demonstrate the ability to analyze the performance of vapor and gas refrigeration and heat pump cycles.

Academic Honor Code: I expect compliance with Georgia Tech's Academic Honor Code at all times. Please read and understand this document (if you have not already done so): http://www.policylibrary.gatech.edu/student-affairs/academic-honor-code
In this class you are allowed to work in groups on all homework and practice problems, but not on any exams and/or tests. Any work you turn in must be your own.

I provide an equation sheet for exams/test (you will be able to find the equation sheet under resources/files on Canvas): any equations used in homework, tests and exams have to be derived from these or specifically discussed in class as to be acceptable forms of the provided equations to be acceptable in an exam.

In-class exams are to be only your own work; you may not receive or offer help to other students on tests or exams. You may only use the resources cited in the Syllabus and provided by the instructor during tests and exams.

The perception of non-compliance with the above guidelines will result in a non-disputable 0 on that assignment, midterm, of final.

Accommodations for Students with Disabilities
If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement
At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.