ME 3322 – Thermodynamics, Fall 2026

Section A: T Th 12:30 - 1:45 PM, MRDC 2407
Class website (Canvas): https://gatech.instructure.com/courses/532116

Catalog description: Introduction to thermodynamics. Thermodynamic properties, energy and mass conservation, entropy and the second law, and second law analysis. Thermodynamic analysis of power, refrigeration, and heat pump systems; vapor cycles and gas cycles.

Instructor: Prasoon Suchandra, PhD (Prasoon, *he/him/his*)
Email: psuchandra3@gatech.edu
Always email with '[ME3322A]' at the start of the subject

Office hours (OH): TBD, starting from week 2 (Aug 31)
Email to schedule an appointment if you cannot attend these office hours

Recitation: TA: TBD
Recitation schedule: TBD
OH: TBD

Grader: TBD

Prerequisites: (Undergraduate Semester level PHYS 2211 Minimum Grade of C or Undergraduate Semester level PHYS 2231 Minimum Grade of C) and (Undergraduate Semester level MATH 2403 Minimum Grade of C or Undergraduate Semester level MATH 24X3 Minimum Grade of T or Undergraduate Semester level MATH 2413 Minimum Grade of C or Undergraduate Semester level MATH 2552 Minimum Grade of C or Undergraduate Semester level MATH 2X52 Minimum Grade of T or Undergraduate Semester level MATH 2562 Minimum Grade of C)

Course content:

- Definitions: property, state, closed and open systems, temperature, pressure, work interactions, and heat transfer. State postulate.
- Forms of energy: kinetic, potential, and internal.
- Properties of pure substances, equilibrium diagrams, and quality; ideal gases and incompressible substances.
- Conservation of mass: steady and transient processes.
- Conservation of energy: closed and open systems, and steady and transient processes.
- Introduction to the second law: Kelvin-Planck and Clausius statements; Clausius inequality; irreversibility and entropy; and the *Tds* equations.
- Second law analysis of thermodynamic systems: exergy (availability); entropy production; and closed and open systems.
- Power, refrigeration, and heat pump systems: vapor cycles (e.g., ideal, Rankine, and vapor-compression); and air standard analysis of gas cycles (e.g., ideal, Brayton, Otto, and diesel).

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.

Textbook: Michael J. Moran, Howard N. Shapiro, Daisie D. Boettner, and Margaret B. Bailey, *Fundamentals of Engineering Thermodynamics*, 7th edition or later or zyBook edition, John Wiley & Sons

zyBook site (strongly recommended) –
Sign in or create an account at https://learn.zybooks.com/signinLinks to an external site.
Enter zyBook code: GATECHME3322SuchandraFall2026
Subscribe ($69)

Video lectures by Prof. David Miller, Cal Poly (complementary) - https://www.youtube.com/playlist?list=PLZOZfX_TaWAH3zDurz4ds7jMFzhxhfKZV

Canvas: A course Canvas site will be used for this class - https://gatech.instructure.com/courses/532116

Grading policy: Your final grade will be assigned as a letter grade according to the following *tentative* scale:

$90 \leq A$
$80 \leq B < 90$
$70 \leq C < 80$
$60 \leq D < 70$
$F < 60$

Assessments:

Exam 1	20% (Oct 1)
Exam 2	25% (Nov 5)
Final Exam	35% (Dec 17)
Homework	10%
Project / field trip	10%

Reading / watch assignments: Not graded directly (expect questions on exams)

Homework: Homework will be assigned in class and / or on Canvas on a regular basis. Feel free to discuss the problems with your fellow classmates but be sure to turn in an individual assignment. Homework assignments will be due approximately a week after they are assigned. Please email me one day in advance if you are unable to meet the due date.

Discussions: Via Canvas / in-class / during OH

Exams: Exams will be in-class / in-person.

If you have outstanding circumstances, please contact me as soon as possible. Unexcused absences will result in a grade of zero for the missed exam. If you miss an exam, *contact me immediately!*

Final exam: **Thursday, Dec 17th: 11:20 am -2:10 pm (as per GT schedule)**

Integrity: Georgia Tech aims to cultivate a community based on trust, academic integrity and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit https://osi.gatech.edu/students/honor-code.

Any student suspected of cheating or plagiarizing on an exam will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodations: If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at 404-894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also email me as soon as possible to set up a time to discuss your learning needs.

Absences: Exams will be in-class / in-person. If you miss a lecture, it is your responsibility to get lecture notes and all relevant information from a classmate.

Missed assignments / exams due to a university excused absence will be rescheduled on an individual basis. Absences without university documentation are unexcused unless arranged with the instructor prior to the absence. Information on documentation for absences due to illness or emergency can be found here: https://catalog.gatech.edu/policies/student-absence-regulations/.

Re-grading: Requests for re-grades of exams must be submitted in writing by the end of the second lecture immediately following when the exam grade was posted / announced. Clearly describe what grading error you believe was made and suggest what you think a fair resolution would be.

Collaboration: Students are encouraged to work in groups to gain a better understanding of course material. Students may collaborate on out-of-class assignments (homework or group assignment) but must submit individual work (or one submission per group). If you receive substantial assistance or collaboration on an assignment or problem from another person, please credit them on your submission.

Collaboration on in-class assignments (exams) is strictly prohibited.

Use of GenAI: MS co-pilot (preferred) via GT login - https://oit.gatech.edu/ai/tools
Allowed only on HWs (or projects, if any)

Use of electronics during exams: No use of cell phones, tablets, laptops, AR/VR devices, Meta glasses, etc allowed during the exam. Only use of calculators (without internet / Bluetooth) is allowed.

Computer tools: MATLAB / python / EES (Engineering Equation Solver) - https://ees.cae.wisc.edu/

How to succeed in this class: Attend lectures
Ask questions / comment (in lectures, office hours, email the instructor)
Discuss with TA / grader
Suggested reading / multimedia
Revise notes from the previous lecture
Do all homework
Discuss with your classmates / discussion on Canvas