ME 200 – THERMODYNAMICS
FALL 2025
SYLLABUS – 8/22/2025 Version

Course Description: Introduction to classical thermodynamics through first and second law; system and control volume analyses of thermodynamic processes; irreversibility and availability; relations for ideal gas mixtures

Prerequisites: MATH 241

Instructor and TA:

Prof. Jiajun He (Instructor) Email: jiajunhe@illinois.edu Office: LUMEB 2026

Sadman Sakib (TA) Email: ssakib2@illinois.edu Office: MEL 1410

Class Meetings: Mon, Wed, and Fri 12:00 pm – 12:50 pm in 2035 Campus Instructional Facility. You are expected to attend every class session. ***If you miss class, it is your responsibility to obtain all assignments and class notes from students who were present in class.*** Lecture slides will be shared via Canvas.

Office Hours:

Prof. Jiajun He: Mondays 2:00 – 3:00 pm (LUMEB 2026)

Sadman Sakib: Thursdays 9:30 – 10:30 am (MEL 1410)

Additional office hours by appointment.

Course Website: Canvas (https://canvas.illinois.edu/)

Homework assignments and solutions, supplementary handouts, and other relevant information will be made available through the Canvas site.

Textbook: Fundamentals of Engineering Thermodynamics, 9th Ed., 2018
Moran, Shapiro, Boettner, and Bailey, ISBN: 9781119456285

Important notes:

- Homework will be assigned from this textbook.
- Textbook will be used on **quizzes and exams.**
- Either hard copy or electronic copy of the textbook can be used. If you choose the electronic copy of the textbook, you will need to print out the necessary pages for the quizzes and exams.
- An earlier version of the textbook can be used, but please pay attention to the potentially different numbering of the homework problems in different versions.

Homework: Homework assignments will be posted each week through the Canvas site. **Homework must be turned in electronically through Canvas by the due date** (Wednesdays). Late assignments may be turned in by noon the following day (Thursdays) for a 20% penalty. No further assignments will be accepted after the 2nd deadline. One low homework grade will be dropped when computing the final grades. **Approximately 6 or 7 problems will be assigned each week**, and you are responsible for the content of all assigned problems. However, **only the first five (5) will be graded** for credit. Grading is effort-based. Solutions to all assigned problems will be posted on the class website after the late homework deadline. Collaboration on homework is encouraged, but every student needs to submit his or her own homework.

Extra credits: If you complete ALL the optional problems showing steps, you will receive 5 extra points. That means you will receive a total score of 105 for that specific homework assignment. This score will be used to calculate your final grade for the course.

If you need help with the homework, use the following resources:

- Get help from a classmate, but do not copy their solution. Discussion among students to understand homework problems or to prepare for quizzes/exams is encouraged. Working in a group on the homework can be an excellent way to learn the material; however, do not get in the habit of letting others do the thinking for you. Do not divide up the problems but help each other when you get stuck. Remember that every student will be individually accountable for the material on the quizzes and the final exam.
- Get help from the instructor and/or TA (in class or during office hours)

Quizzes:

Six (6) quizzes will be given during the semester. These quizzes will take place at the beginning or towards the end of the class period and will last about 20 minutes. **5 of the 6 quizzes will count towards the final grade.** No late quizzes will be given unless you have a valid reason for not attending the specific lecture (i.e., illness, injury, or others identified in the University Student Code). The material that will be tested on the quizzes covers the most recent homework due before the quiz. The quiz will typically consist of 1 problem (with 1 or multiple sub-questions), similar to class examples and homework problems.

Quizzes will be open-book and open notes. Please make sure to bring a calculator. A hard copy of the textbook or printouts of the electronic textbook will be required. No other electronic devices are allowed (laptop, tablet, cell phone, etc.)

Exams:

There will be a 50-minute **midterm exam** during class.

There will be a **comprehensive 3-hour final exam** to be held at the end of the semester. please confirm the date and venue in the official UIUC examination timetable.

Makeup exams will only be permitted by prior arrangement and only for reasons described in the U of I Student Code.

The midterm and final exams will be open-book and open notes. Please make sure to bring a calculator. A hard copy of the textbook or printouts of the electronic textbook will be required. No other electronic devices are allowed (laptop, tablet, cell phone, etc.)

Students missing the midterm or final exam without a valid excuse, and those who neither notify the instructor of their absence before the exam begins nor are exempt based on incapacitation (see link below) will receive a grade of zero on the exam. Students with a valid excuse for missing the final exam, and who either notify the instructor before the beginning of the exam or present documentation of incapacitation, might be eligible to receive a grade of "Incomplete." (Note that this grade is not awarded by the instructor, but rather by the College of Engineering upon recommendation by the instructor and department.)

Excused Absences from Exams:

All Students: https://studentcode.illinois.edu/article1/part5/1-501/

Student Athletes: https://studentcode.illinois.edu/article1/part5/1-502/

Grading Policy:

Final course grades will be calculated based on the following scheme:

- Homework 30%
- Quizzes 25%
- Midterm exam 15%
- Final exam 30%

Final letter grades will be assigned based on the scale below.

Grading Policy:

Final Course Average	*Letter Grade*
97 – 100	A+
94 – 96	A
90 – 93	A-
87 – 89	B+
84 – 86	B
80 – 83	B-
77 – 79	C+
74 – 76	C
70 – 73	C-
67 – 69	D+
64 – 66	D
60 – 63	D-
0 – 59	F

For final grades that are very close to the cutoff lines (**less than 0.5 below the cutoff**, e.g., 96.5, 93.5, …), the upper letter grade will be given. The instructor has no predetermined 'target' grade distribution, and the distribution can vary significantly from semester to semester.

Academic Integrity:

The highest academic integrity is expected. Academic violations will however be dealt with according to the UIUC Student Code, Article 1, Part 4. Violations will be reported to the College of Engineering. The recommended penalty will be either failure of ME 200, or failure of ME 200 and separation from the College of Engineering or UIUC.

Link to more information: https://studentcode.illinois.edu/article1/part4/1-401/

Course Calendar: ME 200 – FALL 2025 (as of 8/22/2025)

Lecture		Week	Date	HW Due	Topic	Reading
1	M	1	Aug 25		Course intro, introductory concepts: system, boundaries, properties, state, process, equilibrium, temperature, pressure, properties and states, phase change	1.1-1.9 3.1-3.5
2	W		Aug 27			
3	F		Aug 29			
4	M	2	(no class)		Specific heats, P-v-T property relations, thermodynamic tables and diagrams, table interpolation, ideal gas law, using ideal gas for properties,	3.6-3.14
5	W		Sep 3	HW1		
6	F		Sep 5			
7	M	3	Sep 8		Polytropic processes, First Law, energy, work and heat	3.15 2.1-2.5
8	W		Sep 10	HW2		
9	F		Sep 12			
10	M	4	Sep 15		Closed system energy balance, thermodynamic cycles	2.5, 3.8, 3.14, 2.6
11	W		Sep 17	HW3		
12	F		Sep 19			
13	M	5	Sep 22		Control volume analysis, open system energy balance, components of thermal systems and analysis	4.1-4.12
14	W		Sep 24	HW4		
15	F		Sep 26			
16	M	6	Sep 29		Second Law of Thermodynamics, irreversibility, cycle efficiencies	5.1-5.7
17	W		Oct 1	HW5		
18	F		Oct 3			
19	M	7	Oct 6		Carnot cycle and efficiency, entropy, isentropic process	5.8-5.11, 6.1-6.5, 6.11
20	W		Oct 8	HW6		
21	F		Oct 10			
22	M	8	Oct 13		Entropy balance: open and closed systems	6.6-6.10
Midterm	**W**		**Oct 15**	HW7		
23	F		Oct 17			
24	M		Oct 20		Isentropic efficiency: compressors and turbines, power generation	6.12
25	W		Oct 22	HW8		
26	F		Oct 24			
27	M	9	Oct 27		Vapor power systems: Rankine cycle, power plants, comparison to Carnot, Rankine cycle improvements	8.1-8.5
28	W		Oct 29	HW9		
29	F		Oct 31			
30	M	10	Nov 3		Gas power systems: Brayton / gas turbine cycle	9.5-9.11
31	W		Nov 5	HW10		
32	F		Nov 7			
33	M	11	Nov 10		Gas power systems: Otto and Diesel cycles	9.1-9.4
34	W		Nov 12	HW11		
35	F		Nov 14			
36	M	12	Nov 17		Refrigeration and heat pump cycles: vapor compression	10.1-10.7
37	W		Nov 19	HW12		
38	F		Nov 21			
	M		Nov 24		Fall break	
	W		Nov 26			
	F		Nov 28			
39	M	13	Dec 1		Ideal gas mixtures, psychrometrics	12.1-12.9
40	W		Dec 3	HW13		
41	F		Dec 5			
42	M	14	Dec 8		Review, course evaluation	
43	W		Dec 10			
Final			**Dec 18**		**1:30 pm - 4:30 pm CIF 2035**	