ME 205 Intro to Thermodynamics

[IN PERSON]

CRN: 14491

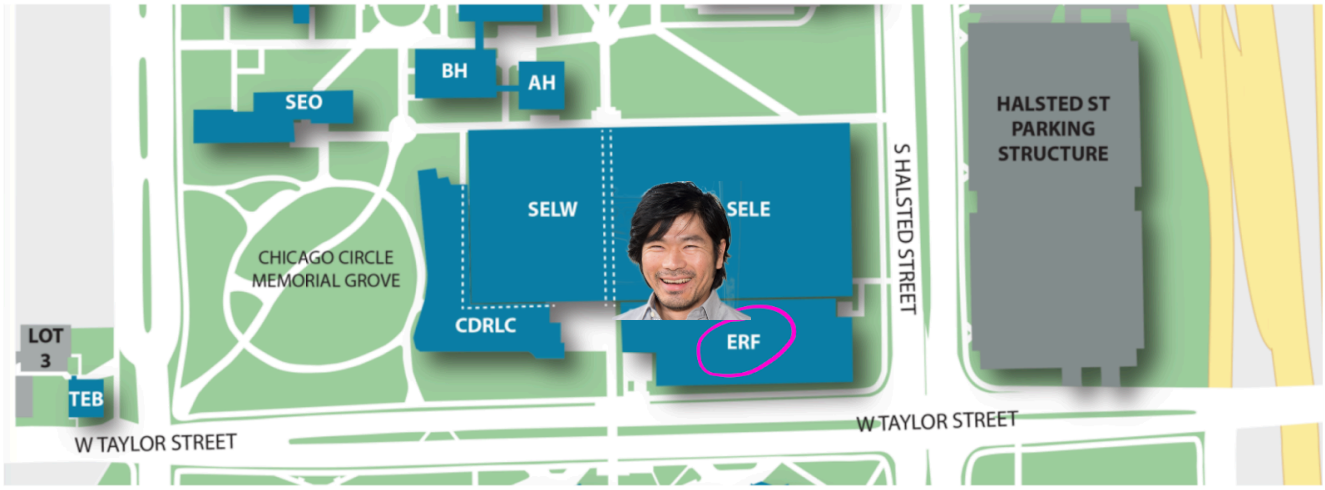
Summer 2024

Prof. Yeow Siow, 3033 ERF, yeowsiow@uic.edu

Class Meetings: MW 1pm – 3:30pm CST

Classroom: 1003 ERF

#INTHIS TOGETHER #ALONE TOGETHER



Essential Learning Resources, Hardware, Software & Platforms:

1. Class homepage
2. Gradescope
3. Discord, Piazza
4. Visualization software (Paraview or other open-source software)
5. Google Docs/Sheets/Slides
6. Zoom (for drop-in and help hours)
7. Phone/laptop/tablet to bring to classroom
8. Book: Moran et al., "Fundamentals of Engineering Thermodynamics," any edition, Wiley.

Prerequisites: PHYS 141, MATH 181

Course Description: The what, why and how of thermodynamics and its applications

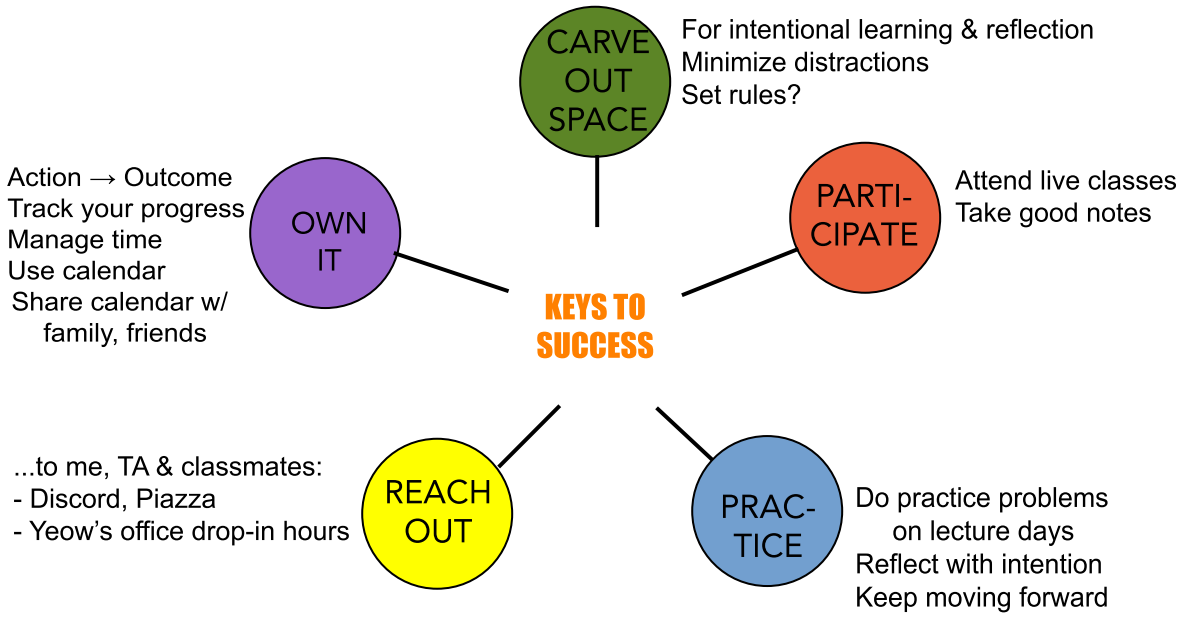
Course Objectives:
1. Review and reinforce what you learned in Physics I
2. Introduce the laws of thermodynamics and their applications, and
3. Learn how to analyze real-world problems using thermodynamics

Thermodynamics

I strive to help you succeed in this course and in achieving your teaching goals! I will do my best to provide guidance along the way, and practice what I teach. #walkthetalk

I firmly believe that *each and every one of you* – the learner – can succeed in my class, regardless of your identity or life experiences. I do not believe in curving, or casting students in a predefined (bell) curve.

I have devised the following "5 Keys to Success" in this class for you.



Own it. Own your learning. Be accountable to yourself. Be an active participant of this learning community that's this class, and let's make this class a safe space to freely share ideas and be constructive.

Beyond your learning, on a system level your feedback will help improve this course, the ME undergraduate curriculum, and my teaching. I therefore ask that you complete the UIC course evaluation at the end of this semester.

Grading...and the meaning of letter grades

I've abandoned the conventional 100-point percentage scale and instead adopted a **"fluency" system**.

Your learning will be assessed primarily through projects where you demonstrate fluency in the following seven topic categories ("CAT"):

CAT 1: Definitions and terminology
CAT 2: First law of thermo for closed systems
CAT 3: Cycle efficiencies
CAT 4: Property relations for pure substance
CAT 5: Property relations for ideal gas
CAT 6: First law for open systems
CAT 7: Second law/entropy change/isentropic processes

and an additional "power skill" category:

CAT 8: Effective communication

For each category, you can earn up to two "fluency points" (FPs) according to this scale:

0 FP: Missing or significantly lacking
1 FP: Some inaccuracies
2 FP: Spot on

These fluency points are earned only after you have demonstrated a category at least twice (i.e., attempted at least two projects containing the same category). Each category will be attached to two or more projects, giving you multiple opportunities to demonstrate fluency. And the best attempt counts – meaning if you do badly the first time in a certain category, you'll get a second (or more) chance to redeem yourself.

Project descriptions and due dates will be posted on the class homepage, and submission on Gradescope only.

In addition to projects (where you can earn up to 16 FPs), additional FPs may be earned through the following tasks:

- Notes, Practice & Reflection (NPR): Take notes of each live lecture, attempt all practice problems, and reflect on your learning, struggles, self improvement goals, etc. Digitize these into a single PDF and submit them on Gradescope. Due a day after each live class.
- In-Class Quiz (ICQ): One or more hands-on exercises during a live class. Due in class.

There will be one NPR and ICQ associated with each live class – and we have a total of 15 live classes. For each of these three tasks, if you successfully (i.e., on time and accurate) complete at least 50% of the total number assigned, you will earn one extra FP; two extra FPs if 75%. In other words, you may be able to earn up to 4 extra FPs in addition to the 16 FPs through projects.

The relationship between UIC letter grades and FPs is defined according to:

Total "FP" Earned	UIC Grade
≥ 14	A
11 - 13	B
9 - 10	C
7 - 8	D
< 7	F

Submission Accommodation

Since the summer session is fast-paced, and since all assigned tasks (projects, NPR, ICQ) are meant to be an assessment *for* learning (instead of assessment *of* learning), due dates are strictly enforced in order for you to receive timely feedback.

However, I highly welcome requests for accommodation! An accommodation can be given if ***prior*** notifications are approved (e.g., DRC accommodation, UIC religious observation, student org competition travel, student athlete away game, etc.), or if it's due to an emergency – simply provide me with relevant documentation afterwards.

Important Dates

Last day to drop a class without "W":	June 14, 2024 (Fri)
Juneteenth holiday:	June 19, 2024 (Wed)
Last day to drop a class with "W":	July 12, 2024 (Fri)

Academic Integrity & AI

I highly value originality and authenticity, which serve as the basis for the fluency grading system introduced above. To ensure fairness and, ultimately, achieve equity among all students, a good starting point is for everyone to comply with UIC academic integrity policy. Did you know that forgetting to cite other people's work in your writing could be viewed as plagiarism? Or copy-paste from Wikipedia verbatim?

Use of generative AI is encouraged, to make your workflow more efficient and to help you learn (see UIC statement). AI tools, however, are not permitted as co-author for any written deliverable in this course.

Emergency Preparedness

Download the UIC SAFE app. And memorize this number: UIC Police 312-355-5555 (or 5-5555 on any campus phone).

Schedule and Content

Week	Day	Date	Topics	Practice Problems & Projects
1	1	6/10	Welcome & syllabus Ch.1: Definitions & terminologies	See class website for details
	2	6/12	Ch.2: 1st law for closed sys, heat & work, polytropic	
2	1	6/17	Ch.2: 1st law for cycles, efficiencies	
	2	6/19	– NO CLASS: Juneteenth holiday –	
3	1	6/24	Ch.3: Property relations for pure subst (pvT)	
	2	6/26	Ch.3: pvT, quality	
4	1	7/1	Ch.3: u & h, cv & cp, solids & liq	
	2	7/3	Ch.3: Ideal gas	
5	1	7/8	Ch.4: Open systems (control volume, CV), conservation laws	
	2	7/10	Ch.4: Steady-state CV analysis	
6	1	7/15	Ch.5: 2nd law, reversibility, max eff, Carnot	
	2	7/17	Ch.6: Entropy change, Clausius, T-ds	
7	1	7/22	Ch.6: 2nd law for closed & open systems	
	2	7/24	Ch.6: Isentropic processes	
8	1	7/29	Ch.6: Isentropic efficiencies	
	2	7/31	Power & AC cycles, review	