

ME 40: Thermodynamics [Section 001]

Mechanical Engineering, UC Berkeley
Course Information
Spring 2019

Classes MWF 10:10 am - 11:00 am
105 North Gate Hall

Instructor Prof. Chris Dames
cdames@berkeley.edu
Office Hours: Fri. 12-1pm, 6107 EH (may move to 6101 “Tien Room” if need more space).

Teaching Support Staff *Head GSI, and Tue/Thu Discussions* *Reader*
Josh Wilbur, jdwilbur@berkeley.edu Larry Lau, shlarrylau@berkeley.edu
Office Hours: Tue 3-4pm, 10 Jacobs Office Hours: Thu 1-3pm, 1171 EH.

GSI for Mon Discussion
Lei Tang, leit@berkeley.edu
Office Hours: Mon 12-1pm, 1171 EH.

Communications Website: <https://bcourses.berkeley.edu/>
Emails to course staff: Begin subject line with “ME40: ...”

Description ME 40. Thermodynamics. (3 units). 3 hours lecture + 1 hour discussion
Prerequisite(s): Chemistry 1A, Engineering 7, Mathematics 1B, and Physics 7B.

This course introduces the fundamentals of energy storage, thermophysical properties of liquids and gases, and the basic principles of thermodynamics which are then applied to various areas of engineering related to energy conversion and air conditioning.

Course Objectives Upon completion of this first course in engineering thermodynamics, students should be able to:

- Evaluate the properties of an ideal gas, and be aware of some corrections for non-ideal behavior.
- Evaluate the properties of pure substances from tabular data.
- Identify appropriate control volumes for the analysis of various engineering systems such as nozzles, pumps, turbines, and heat exchangers.
- Apply the 1st law of thermodynamics (energy) to open and closed systems.
- Apply the 2nd law of thermodynamics (entropy) to open and closed systems.
- Identify fundamental limits on the efficiency of refrigerators and heat engines.
- Analyze the performance of basic cycles, such as the Rankine or Brayton cycle.

Required Text Cengel & Boles, *Thermodynamics: An Engineering Approach*, **8th Edition**.
Other recent editions may be acceptable (e.g. 6th, 7th, or 9th), but it is your responsibility to determine the correct homework problems and readings if they do not match up.

Supplementary Texts These introductory texts are recommended to complement Cengel & Boles if you'd like a different perspective. Both are placed on reserve in the Engineering Library.
Moran & Shapiro, *Fundamentals of Engineering Thermodynamics*.
Wark & Richards, *Thermodynamics*.

Programming	You will occasionally write simple programs using software of your choice, such as Matlab, Python, etc.	
Evaluation	Homework	30%
	Midterms (tentatively March 4 and April 15)	35% total
	Final (Tues, May 14, 3:00 pm - 6:00 pm).	35%
Attendance	Attendance at lectures and discussions is expected, but not required.	
Homework	We usually will only grade an unannounced <i>subset</i> of the problems each week. Solutions for all problems will be posted to the course website. Your one lowest HW score will be dropped at the end of the semester.	
Exams	Exams will be closed book/notes/computers/phones. Exceptions: MT1: Allowed 1 sheet of your own notes (8.5" x 11", double-sided). MT2: Allowed 2 sheets of your own notes (8.5" x 11", double-sided). Final: Allowed 3 sheets of your own notes (8.5" x 11", double-sided).	
Regrades	Any serious concerns about grading should be addressed to the instructor (not the GSIs or Reader) <i>within 7 days</i> of receiving the graded homework or exam back. Include a <i>brief, written explanation</i> of your concern. Re-graded scores may go up, down, or stay the same. I reserve the right to re-grade the other problems on the homework or exam as well.	
Absences, Late Work, and Make-ups	Lectures: Obtain notes from a classmate.	
	Homework: No late homework accepted.	
	Exams: Missing an exam will result in a zero grade for that exam unless alternative arrangements are made with the instructor <i>prior</i> to the exam. (Exceptions may be made for severe medical or family emergencies.) When granted, makeup exams may be oral or written.	
Other Expectations	<ul style="list-style-type: none"> • Questions are encouraged! • Turn off cell phones. • Treat your colleagues, instructor, GSI, and Reader with respect. • No food or drinks. (Exception: water.) 	
Collaboration vs. Academic Misconduct	<p>Collaboration and discussion on the homework is encouraged in this class, but assignments turned in for a grade must be a student's own work. Consulting with your colleagues is fine, but <i>copying from somebody else's homework solution is considered academic misconduct</i>. (I strongly recommend that you <i>first</i> attempt every homework problem on your own, and only <i>then</i> meet with your colleagues to check and improve your work. The best learning usually comes after getting stuck on your own.)</p> <p>"Academic misconduct is any action or attempted action that may result in creating an unfair academic advantage for oneself or an unfair academic advantage or disadvantage for any other member or members of the academic community." (Definition from UC Berkeley Center for Student Conduct). <i>Academic misconduct will be referred to the Student Conduct Office.</i></p>	