ME 304: Energy and Thermodynamics, Fall 2012

Instructor:
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Course page: http://oned.bu.edu/ME304

Lectures: MW 8-10 AM (PHO 205)
Office hours: MW 10-11 AM. Please feel free to email linx@bu.edu for extra hours
Discussions: Tu 6-7 PM (PHO 202); Th 11 AM - 12 PM (PSY B45)
GTF: Yang Yu (yuyang20@bu.edu)

Lecture notes: http://oned.bu.edu/ME304/lecture.html; usually available online one day (if not earlier) before the lecture.

Textbook: *Fundamentals of Engineering Thermodynamics* by Moran, Shapiro, Boettner, and Bailey, 7th Edition, Wiley (ISBN: 978-0-470-49590-2)

Reference: *The Feynman Lectures on Physics: Vol. 1,* by Feynman, Leighton, and Sands, Addison-Wesley (ISBN: 978-0-805-39049-0)

Pre-requisites by Topic:
1) Differential and integral calculus, multivariate calculus
2) One-semester college physics (calculus based)

Goals: To deliver a broad and in-depth presentation of modern thermodynamics with sufficient coverage of cycles as a prerequisite for focused study of energy conversion and propulsion.

Grading:

Assignments (10%):	Ten assignments
Quiz (20%):	Twelve (or more) quizzes may be held at any regular lecture time. Best ten quiz grades count and no replacements will be allowed. Cover topics discussed last week. Open book.
Labs (20%):	Review three sample or any other laboratory exercises relevant to energy and thermodynamics. Form a team of three people or less to design your favorable laboratory. Try your best to perform the designed lab and write one lab report.
Exams (50%):	Three exams, each 25%. Best two exam grades count. Closed book, one formula sheet (A4 size) allowed.

Bonus: (+10%) Complete and turn in on time all assignments, all quizzes, and one lab design; or (+5%) if miss only one single quiz.
Bonus: (+5%) Actively ask good questions during lectures, discussion sections, and/or office hours.

A	A-	B+	**B**	B-	C+	C	C-	D	F
90-100	85-89	80-84	**70-79**	65-69	60-64	55-59	50-54	30-49	0-29

Assignments: Homework announcements will be communicated through the course page at http://oned.bu.edu/ME304. Homework assignments are due a week after they are handed out. Solutions will be available on-line after the due day.

Lab exercises: There are three existing lab exercises for this course. If interested, sign-up sheets will be posted once the labs are scheduled.

Lecture Schedule

Lecture	Topic	Text
1	What is temperature?	Chapter 1
2	Equivalent mechanical and thermal driving forces	Chapter 2
3	Work, heat, and energy	
4	P-V-T surface and steam tables	Chapter 3
5	Enthalpy and specific heats	
6	Temperature revisited	
7	Review	
	Midterm exam I	
8	Mass and energy rate balances	Chapter 4
9	Open system applications	
10	Two statements	Chapter 5
11	Visiting Carnot in 1824	
12	Heat-temperature ratio	Chapter 6
13	Entropy criterion and isentropic process	
14	Entropy balance and applications	
15	Exergy	Chapter 7
16	Review	
	Midterm exam II	
17	Rankine cycle	Chapter 8
18	Improving performance	
19	Improving performance continued	
20	Gas power system	Chapter 9
21	Maxwell relations	Chapter 11
22	Natural variables	
23	Ends at the start: temperature	
24	Review	
	Final exam	