ME 304: Energy and Thermodynamics, Fall 2010

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

Lectures:	MW 8-10 AM (PHO 203)
Office hours:	MW 10-11 AM or email linx@bu.edu
Discussions:	Tu 6-7 PM (PSY B47); W 2-3 PM (PHO 202)
Labs:	ENG B01 (detailed schedule information TBA)
GTF:	TBA

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 and Shapiro, 6th Edition, Wiley (ISBN: 978-0-471-78735-8)

References: *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
Lab reports (5%):	Two laboratory exercises; must complete both to pass the course
Quiz (25%):	Twelve (or more) quizzes on topics covered in the last week; may be held at any regular lecture time; open book & lecture notes (challenging questions expected); best ten quiz grades count (no replacement allowed)
Exams (60%):	Three exams; each 30%; best two grades count; closed book; allow one-page (A4 size) formula sheet

Bonus: (+10%) Complete and turn in on time all assignments, lab reports, and quizzes; or (+5%) if complete and turn in on time all assignments and lab reports and 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 will be two lab exercises for this course. Sign-up sheets will be posted once the labs are scheduled. The experiments will be done in groups, but the reports are individual. Reports are due on the Monday following the lab.

Lecture Schedule

Lecture	Date	Topic	Text
1	9/8	What is temperature?	Chapter 1
2	9/13	Equivalent mechanical and thermal driving forces	Chapter 2
3	9/15	Work, heat, and energy	
4	9/20	P-V-T surface and steam tables	Chapter 3
5	9/22	Enthalpy and specific heats	
6	9/27	Temperature revisited	
7	9/29	Review	
	10/4	**Midterm exam I**	
8	10/6	Mass and energy rate balances	Chapter 4
9	10/12	Open system applications	
10	10/13	Two statements	Chapter 5
11	10/18	Visiting Carnot in 1824	
12	10/20	Heat-temperature ratio	Chapter 6
13	10/25	Maxwell relations	Chapter 11
14	10/27	Natural variables	
15	11/1	Constructing thermodynamic tables	Chapter 6
16	11/3	Entropy criterion and isentropic process	
17	11/8	Review	
18	11/10	**Midterm exam II**	
19	11/15	Exergy	Chapter 7
20	11/17	Rankine cycle	Chapter 8
21	11/22	Improving performance	
22	11/29	Gas power system	Chapter 9
23	12/1	Refrigeration and heat pump systems	Chapter 10
24	12/6	Artificial photosynthesis	
25	12/8	Ends at the start: temperature; Review	
		Final exam	