ME 304: Energy and Thermodynamics, Spring 2012

Instructor:
Professor James Bird
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Phone: TBD
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Course web page: TBD

Course schedule:
Lectures: MW 8-10 AM (location TBD)
Office hours: MW 10-11 AM (location TBD); for extra hours, please email TBD
Discussions: TBA
Labs: Detailed schedule information TBA
GTF: TBA

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

Prerequisites:
1) Differential and integral calculus, multivariate calculus
2) One-semester college physics (calculus based)

Course learning objectives:
This course will 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.

Policy on collaboration:
Collaboration is encouraged on homework and labs, however students should turn in their own work in their own words. No collaboration is permitted on quizzes or exams.

Grading:

Assignments (10%):	Ten assignments
Lab reports (10%):	Three laboratory exercises; must complete at least two to pass the course; best two grades count
Quiz (20%):	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 (8.5''x11'') formula sheet

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

Assignments: Homework announcements will be communicated through the course webpage. Homework assignments are due a week after they are handed out. Solutions will be available on-line after the due day. On each assignment one problem will be randomly selected and graded in full (10 points) and other problems will receive 1 point if evidence of sufficient effort to complete. This grading system is designed to provide the GTF with more time to help you understand the material instead of using that time to check all of your work.

Lab exercises: There will be three lab exercises for this course. Sign-up sheets will be posted once the labs are scheduled. Some experiments may be done in groups, but all reports are individual. Reports are due on the Monday following the lab.

Lecture by topic:
Although subject to change, we will cover the following topics around these given dates.

Lecture	Date	Topic	Text
1	1/18	What is thermodynamics?	Chapter 1
2	1/23	Relating mechanical and thermal driving forces	Chapter 2
3	1/25	Work, heat, and energy	
4	1/30	P-V-T surface and steam tables	Chapter 3
5	2/1	Enthalpy and specific heats	
6	2/6	Equations of state	
7	2/8	Review	
	2/13	**Midterm exam I**	
8	2/15	Mass and energy rate balances	Chapter 4
9	2/21	Open system applications	
10	2/22	Second law of thermodynamics	Chapter 5
11	2/27	Applying the second law	
12	2/29	Carnot cycle, thermal efficiency	
13	3/5	Introducing entropy	Chapter 6
14	3/7	Entropy balance	
15	3/19	Isentropic processes	
16	3/21	Exergy	Chapter 7
17	3/26	Vapor power system	Chapter 8
18	3/28	Review	
	4/2	**Midterm exam II**	
19	4/4	Improving vapor power system	
20	4/9	Gas power systems: internal combustion	Chapter 9
21	4/11	Gas power systems: turbines	
22	4/18	Maxwell relations	Chapter 11
23	4/23	Other thermodynamic relations	
24	4/25	Multicomponent systems	Chapter 12
25	4/30	Special topics	
26	5/2	Review	
		Final exam	