

Spring 2008

ME 300: ENGINEERING THERMODYNAMICS I

Credits: 3; 60 Willard; Tues, Thur 1:00 PM- 2:15 PM; prereq. CHEM 110, MATH 141

Text: *Thermodynamics, Concepts and Applications*, by S. R. Turns, Pub. Cambridge

Objective and Scope :

- A. Appreciate the role of thermodynamics in engineering and society.
- B. Understand the importance of thermodynamic properties and know how to use them.
- C. Understand the First Law of Thermodynamics and know how to use it to solve engineering problems.
- D. Understand the Second Law of Thermodynamics and know how to use it to solve engineering problems.
- E. Apply the First and Second Laws to practical systems, including various engineering devices and cycles.
- F. Develop fundamental engineering problem solving skills.

Grading Policy:

	<u>Approximate Weight (+/- 5%)</u>
Homework (one lowest score dropped)	10%
Mid-terms I, II	40%
Quizzes (approx. biweekly, one lowest score dropped)	20%
Final Exam	25%
Other (class participation, punctuality, neatness, attendance, etc, as determined by instructor with input from TA)	5%

Homework : Homework will be assigned frequently and collected regularly. (See *Syllabus and Schedule*.) Group discussion and interaction among colleagues for homework problem solving is encouraged, but it will help only if *you* participate actively and contribute substantially. Final calculations in your homework must be *yours*, not a “consensus” of your study group. One worst homework grade will be dropped. 25% penalty will be assessed per day if there is no valid excuse.

Mid-Term Exams : Two mid-term exams will be held tentatively on the evenings of February 14 and March 27. Exact dates, times, and location will be announced later.

Quizzes : Six quizzes of approximately 20 min each will be held in class on 1/24, 2/07, 2/28, 3/20, 4/10, and 4/24.

Final Exam : To be held as announced by the university.

Make-up Exams/Quizzes : Make-up exams and quizzes will be allowed only under extenuating circumstances. Valid, properly documented and signed paperwork will be required before make up exams/quizzes will be given.

Reading Assignments : These are indicated for each week. It is your responsibility to familiarize yourself with the material before coming to class. Reading assignments may change as the course progresses. Additional details will be announced in class.

Instructor: Anil K. Kulkarni, 334 Leonhard Bldg., Tel. 5-7073; email: akk@psu.edu
Office Hours: Tuesday 4:00 PM - 5:30 PM
Wednesday 3:30 PM - 5:00 PM
Or by prior appointment

Teaching Assistant: Mangesh Kane mak476@psu.edu; details to be announced.

Academic Integrity (or, “Cheating”) Policy: Obviously, cheating of any sort will not be tolerated. Anyone caught cheating will be dealt with according to the policy described in, <http://www.engr.psu.edu/CurrentStudents/acadinteg.asp>

In general, first offence will carry zero points for the item in question; second item will mean an F course grade.

Additional Information: Homework, quiz and exam solutions will be made available on ANGEL. The course structure and the accompanying *Syllabus and Schedule* will be followed as rigorously as possible, but, there may be occasional changes, which will be announced in the class. It is imperative that the class attendance is of utmost importance, and **required**. Announcements may also be made by email using yourID@psu.edu address. If you wish to correspond with the instructor or teaching assistant by email, you must include ME 300 (in addition to other wording) in the subject heading, otherwise, your email message may get lost.

Disclaimer: This is a tentative outline; changes may be made and announced as necessary.

Questions or Comments? Please do not hesitate to contact the instructor.

Spring 2008	Text by S. R. Turns	ME 300 ENGINEERING THERMODYNAMICS I TENTATIVE SYLLABUS AND SCHEDULE (As of 01/10/08; Subject to change--check lecture announcements for revised schedule and syllabus; check ANGEL site for more information) 60 Willard; Tues – Thur 1:00 – 2:15 PM	Instructor: Prof. A. K. Kulkarni Email: akk@psu.edu Office: 334 Leonhard Tel: 814 865 7073 Hours: Tue 4-5:30 PM Wednesday 3:30- 5 PM
Week of	Reading Assgmt. Ch.sec.**	Lecture/Discussion Topics**	TA: Mangesh Kane mak476@psu.edu
January 14	1.1 – 1.5	Introduction; Concepts and Definitions	Homework assignments collected as announced; HW 1
January 21	1.5 – 1.8	Concepts and Definitions , Units, conservation principles, problem solving, properties	Quiz 1 (1/24)
January 28	2.1 – 2.4	Property data, state principles	HW 2
February 4	2.4 – 2.6	Ideal and non ideal gases, phase diagrams	Quiz 2 (2/07)
February 11	2.6 – 2.8, 3.1, 3.2	NIST data base, conservation of mass, liquids, solids	HW 3 Evening Exam I on 2/14
February 18	3.3, 4.1 – 4.5	Conservation of mass, heat and work	HW 4
February 25	5.1-5.2a	First law for a closed system, examples	Quiz 3 (2/28)
March 3	5.3, 7.1, 7.2	First law for control volume, examples	HW 5
March 10		**** Spring Break ****	
March 17	7.2 – 7.6	Steady flow devices and first law	HW 6, Quiz 4 (3/20)
March 24	8.1, 8.2, 6.1 – 6.5	Entropy , Carnot cycle and second law	HW 7; Evening Exam II on 3/27
March 31	6.6, 2.2c, 2.3d, 2.4e - 2.4h	Second law relationships and isentropic processes	HW 8
April 7	2.4e -2.4h, 7.4b, 7.5b	Isentropic efficiencies, polytropic processes	Quiz 5 (4/07)
April 14	8.1	Steam power plant and Rankine cycle	HW 10
April 21	8.1, 8.2a – 8.2c	Steam power plants and jet engines	Quiz 6 (4/24)
April 28	8.2d – 8.2e	Turbine engine cycle analysis and Otto and Diesel cycles	HW 11
May 5		Final Exam as announced by the university	FINAL EXAM

** There may be some mismatch between topics covered in class and those given here during the semester, so the reading assignments will also change correspondingly.