

MAE 3310 Section 001: Thermodynamics I
Spring 2013
Tue Thurs 5:00pm – 6:20pm, Woolf Hall 402

Thermodynamics I is a fundamental course that teaches concepts of energy and thermodynamics. This course provides the basic skills and tools necessary in designing and analyzing *real-life engineering systems*. This course will also serve as preparation for other advanced courses in thermodynamics, energy conversion, heat transfer, etc. Emphasis in this course will be on *engineering concepts*.

Instructor: Dr. Ankur Jain

Teaching Assistant: TBA

Instructor's Office: Engineering Lab Building (ELB), Rm 203

Class Website: Blackboard – elearn.uta.edu

Email Address (*primary means of communication*):

TA: [TBA](#); Instructor: jaina@uta.edu

Phone Number: Instructor: 817-272-9338

Office Hours:

TA: TBA

Instructor: Tuesdays and Thursdays: 9:00am-9:45am, ELB-203

Course Content: Basic concepts and definitions of thermodynamics, properties of pure substance, work and heat, first law of thermodynamics, second law of thermodynamics, entropy, thermodynamics of gases, vapors, and liquids in various non-flow and flow processes.

Textbook: 'Thermodynamics: an Engineering Approach', Y.A. Çengel & M.A. Boles, 7th Edition, McGraw-Hill, 2011, ISBN: 978-0077782979.

Objectives: At the end of this course, the material covered will enable the students to perform energy calculations of engineering systems and analyze the feasibility of the processes undergone by the systems. The students will have an understanding of the following key topics to be covered this semester.

1. Determining properties of real substances, such as steam and refrigerant 134-a, and ideal gases from either tabular data or equations of state.
2. Analyzing processes involving ideal gases and real substances as working fluids in both closed systems and open systems or control volumes to determine process diagrams.

Applying the first law of thermodynamics to perform energy balances, and determining heat and work transfers.

3. Analyzing system, process feasibility and efficiency for open and closed systems.

Course Schedule:

Lectures	Topics	Textbook Sections
1-2	Introduction, definitions, units, properties, cycles, etc.	1.1-1.10
3-5	Energy and Work, energy transfer, First law of thermodynamics	2.1-2.8
6-9	Properties of pure substances, processes, property diagrams and tables, equations of state	3.1-3.8
10-13	Closed systems, energy balance, internal energy, enthalpy, specific heat	4.1-4.5
14-18	Control Volume analysis, steady-flow analysis, common engineering steady-flow devices, unsteady flow analysis	5.1-5.5
19-23	Second law of thermodynamics, Heat engines and refrigerators, Reversible and irreversible processes, Carnot cycle	6.1-6.11
24-28	Entropy, isentropic processes, isentropic efficiency	7.1-7.13
29	Course Review	

Tentative mid-term exam dates: Feb 19 and April 4.

The schedule may undergo minor tweaks based on class needs and requirements.

Important Dates: 30-Jan – Census Date; 12,14-Mar – Spring Break (No class!); 29-Mar – Last Day to Drop Class; May 4-9 – Final Exam (precise date and time TBA).

Quizzes and Exams: Around 6-7 quizzes will be given during class time. Some quizzes will be unannounced. Scores on all quizzes will count towards the final grade.

Homework Assignments: A total of 10 homework assignments will be given. Late submission penalty is 10% per day. Chronically late submission may attract greater penalty. Best 7 scores will be counted towards grading.

Key Assignment: One of the homework assignments will be designated as a **key assignment**, which will be given around April 4. *In order to pass this class, students must submit and pass the key assignment. If the key assignment is not submitted and passed, the student will not pass the class even if he/she scores perfectly on all exams and other assignments.* Please be aware of this policy and treat it with due importance.

Attendance: Attendance is mandatory.

Grading Policy: Final score will be calculated based on the following weights: Final Exam – 25%, Homeworks – 20%, Mid-term Exam1 – 20%, Mid-term Exam2 – 20%, Quizzes – 15%. Tentatively, final grade will be determined as follows: A=85%+, B=75-85, C=60-75, D=50-60, F=50 or below.

Calculator Policy: Only nonprogrammable calculators with basic computational features, such as arithmetic and transcendental functions will be allowed. *The only calculators allowed for exams without prior permission are TI-30XA and TI-30XIIS.* If you wish to use any other calculator, please obtain instructor's approval in advance.

Other Notes:

1. **I am committed for the success of each and every one of my students. I will help you in any way possible to succeed.**
2. **Classroom Etiquette:** Please be on time for the class. Working on laptops/cellphones, texting, working on other courses, etc. are not permitted. I encourage questions and discussions involving the entire class. Please never feel shy to ask questions.
3. **E-mail communication:** E-mail is the preferred means for communicating with the instructor and TA outside class. To ensure that emails are read and responded to promptly, please include 'MAE3310' in the subject line. Please use your UT Arlington email address.
4. **Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/ses/fao>).
5. **Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations is found at www.uta.edu/disability or by calling Office for Students with Disabilities at 817-272-3364.

6. **Academic Integrity:** At UT Arlington, academic dishonesty is completely unacceptable and will not be tolerated in any form, including (but not limited to) “cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts” (UT System Regents’ Rule 50101, §2.2). Suspected violations of academic integrity standards will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion.
7. **Student Support Services:** UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may contact the Maverick Resource Hotline by calling 817-272-6107, sending a message to resources@uta.edu, or visiting www.uta.edu/resources.
8. **Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.
9. **Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory will be asked to complete an online Student Feedback Survey (SFS) about the course and how it was taught. Instructions on how to access the SFS system will be sent directly to students through MavMail approximately 10 days before the end of the term. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback data is required by state law; student participation in the SFS program is voluntary.
10. **Final Review Week:** A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Good Luck with MAE3310 and all your other endeavors this semester!