The University of Texas at Dallas – Course Syllabus

MECH 3310.001– Thermodynamics

Course Information:

Course Number/Section	**MECH3310.001**
Course Title	*Thermodynamics*
Term	Fall 2017
Days & Times	**Tue. & Thur.: 8:30 - 9:45 am**
Meeting Place	***HH2.502***

Professor Contact Information: Dr. Hui Ouyang

Email Hui.Ouyang@utdallas.edu

Note: Please include course number and section "MECH 3310.001" in the subject line for email communications.

Office hour Location	*ECSN 3.214*
Office Hours	*Mon., Tue., Wed. & Thur.* 10:00am – 11:00am

Teaching Assistant:	TBD
Email	*TBD*
Discussion session	**TBD**

Course Description

This course focuses on introductory concepts and definitions of thermodynamics: energy and the first law of thermodynamics; evaluating properties and Ideal gas model; control volume analysis using energy; entropy and the second law of thermodynamics; refrigeration and power systems.

Student Learning Objectives/Outcomes

- Explain the concepts of energy, ideal gases, reversibility and the first and second laws of thermodynamics.
- Perform mass/energy balance of open and closed systems using control volume analysis.
- Obtain the fundamental thermodynamic relations using pressure, volume, temperature and entropy relationships.
- Analyze work-heat transfer relationships in vapor, gas, internal combustion, refrigeration and heat pump systems.
- Function in teams to tackle modern engineering issues in thermodynamics.

Textbook:

Fundamentals of Engineering Thermodynamics, 7th Ed. Moran & Shapiro. Publisher: John Wiley & Sons, Inc. However, if you are able to obtain a copy of another edition, feel free to use it, but please check to make sure you solve the correct homework questions.

Grading & Course Policies:

- Grades will be determined based on a fixed point scale and a weight average of assignments.
- Attendances: **2%** - Attendances are required for this course and account for 2% toward the final grade.
- Homework assignments: **13%** - Credit will be given only if the problems are turned in on time. Homework is due before class starts on the due date (**8:30AM sharp**). Late homework will **NOT** be acceptable. **You are required to work together (2~4 person/group) and submit a single report per group.**
- Six in-class quizzes: **15%**
- Three tests: **15%** for each - Make-up exams will be only available by Professor's permission in advance.

- Final Exam: **15%**
- Project proposal: **10% - You are required to work together (2~4 person/group) and submit a single report.**

Important Notes:

1. **Homework assignments are group based work**. You **MUST** work with the group members together. Each time, please include a **cover page** indicating each member's' contribution.
2. **All tests and final exam are close book and close note with the permission of one page note (A4 paper size – front and back).**
3. **Regrade requests on tests and homework assignments must be made in writing**, and must be turned in within one week of receiving back the graded items. At the same time, however, requests must be turned in more than 24 hours after receiving the graded sheet. In the written regrade request, please prepare a cover sheet (typed, not handwritten) on which you note down what you wish regraded, but nothing more. Any extraneous marks found on a regrade request will result in a score of 0 for the regrade. Further, we reserve the right to regrade the entire item, and the resulting score may in fact be lowered as part of the regrade process.
4. You must have a certified (doctor or otherwise) excuse for missing any test and quiz date. I am willing to work with you for university sanctioned travel or in other circumstances at least one week BEFORE the exam date.
5. At the end, you can choose to **drop one test or your entire quizzes grade.** Then the rest and **homework** will count for **73%** in your final grade.
6. There is a **Bonus Bank** available for everyone. Every student holds an account and can collect bonus points throughout the semester. Please check elearning for details.
7. **There is an online OneNote file available for corresponding sessions. Lecture notes from the instructor are posted on the OneNote. Please check updates periodically using the link provided on elearning.**

MECH 3310.001& MECH 3310.002 – Schedule

Tentative schedule & topics as of Aug. 21st 2017: Changes will be announced in the class through the semester.

Wk	date	Topic	Homework (HW) Due Date	Textbook
1	8/22/2017	Introduction, System, Units, Properties		Chapter 1
1	8/24/2017	Specific Volume, Pressure, Temperature		Chapter 1
2	8/29/2017	Energy; First law of thermodynamics		Chapter 2
2	8/31/2017	Energy; First law of thermodynamics	Quiz 1	Chapter 2
3	9/5/2017	Energy; First law of thermodynamics		Chapter 2
3	9/7/2017	Energy; First law of thermodynamics		Chapter 2
4	9/12/2017	P-v-T	Quiz 2 & HW#1 due	Chapter 3
4	9/14/2017	Test #1 (Chapter 1&2)		
5	9/19/2017	Evaluating properties: U,h,c_p,c_v		Chapter 3
5	9/21/2017	Evaluating properties		Chapter 3
6	9/26/2017	Evaluating properties		Chapter 3
6	9/28/2017	Control volume analysis	Quiz 3 & HW#2	Chapter 4
7	10/3/2017	Control volume analysis		Chapter 4
7	10/5/2017	Control volume analysis		Chapter 4
8	10/10/2017	Control volume analysis	Quiz 4 & HW#3	Chapter 4
8	10/12/2017	Test #2 (Chapter 3&4)		
9	10/17/2017	The second law of thermodynamics		Chapter 5
9	10/19/2017	The second law of thermodynamics		Chapter 5
10	10/24/2017	The second law of thermodynamics		Chapter 5
10	10/26/2017	The second law of thermodynamics		Chapter 5
11	10/31/2017	Entropy	Quiz 5 & HW#4	Chapter 6
11	11/2/2017	TdS relationship		Chapter 6
12	11/7/2017	TdS for Ideal gas		Chapter 6
12	11/9/2017	Test #3 (Chapter 5& part of 6)		
13	11/14/2017	Isentropic efficiency		Chapter 6
13	11/16/2017	Entropy analysis for closed and open system	Quiz 6 & HW#5	Chapter 6
14	11/21/2017	Fall break – no class		
14	11/23/2017	Fall break – no class		
15	11/28/2017	Work and heat analysis for open system		Chapter 6
15	11/30/2017	Work and heat analysis for open system		Chapter 6
16	12/5/2017	***Review for Final Exam***	HW#6	Chapter 6

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.

Required Format for longer Problems in Homework and Exams
(from Fundamentals of Engineering Thermodynamics by Moran & Shapiro, 7th ed.)

Known: State briefly in your own words what is known. This requires that you read the problem carefully *and* think about it.

Find: State concisely in your own words what is to be determined.

Schematic and Given Data: Draw a sketch of the system to be considered. Label the sketch with relevant information from the problem statement. Note down all property values which are given or you look up and find which may be relevant to solving the problem.

Assumptions: To form a record of how you model the problem, list all simplifying assumptions and idealizations made to reduce it to one that is manageable.

Analysis: Using your assumptions and idealizations, reduce the appropriate governing equations and relationships to forms that will produce the desired results.

Examples can be found at Page 24 in textbook.

It is advisable to work with equations as long as possible before substituting numerical data. When all equations and data are in hand, substitute numerical values into the equations. Carefully check that a consistent and appropriate set of units is being employed and then perform the needed calculations. This approach not only reduces math errors, but also makes grading problem sets much simpler for teaching assistants. In the event that there is an error in the solution you write, this approach will likely lead to more partial credit awarded.

Cover page for each homework assignment

Group # ____
Homework #___

Group members' name	Contribution	Initial

Sub - Cover page for homework assignment

Homework #___

Your name: _____

Please evaluate other group members' participation in completing this assignment together. Please give a score at the end of each group members' name using scale 1 to 5. "1" represents "Not cooperating/contributing/helping at all" and "5" represents "Very helpful/cooperating"

Other Group members:

Name	Participation score

Student Conduct & Discipline:
The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, *A to Z Guide*, which is provided to all registered students each academic year.
The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the *Rules and Regulations, Series 50000, Board of Regents, The University of Texas System,* and in Title V, Rules on Student Services and Activities of the university's *Handbook of Operating Procedures*. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).
A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity:
The faculty expects from its students a high level of responsibility and academic honesty.
Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work.
Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.
Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Email Use:
The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

Withdrawal from Class:
The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.

Student Grievance Procedures:
Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's *Handbook of Operating Procedures*. In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel.
The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy:
As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of **F**.

Disability Services:
The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m.
The contact information for the Office of Disability Services is:
The University of Texas at Dallas, SU 22
PO Box 830688
Richardson, Texas 75083-0688
(972) 883-2098 (voice or TTY)
Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance.
It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.

Religious Holy Days:
The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.
The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.
If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.