The University of Texas at Arlington

MAE 3309 - Thermal Engineering, Section 2, Fall 2013
Course Syllabus

Text: **Introduction to Thermodynamics and Heat Transfer, 2nd Ed. by Yanus A. Cengel**

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3. Office Hours: 10 AM - 2 PM MWF or by appointment
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7. Goals: To present basic concepts and definitions in the study of the conversion of heat to work using pure substances, the application of the first and second laws of thermodynamics, entropy and thermal efficiencies, and an introduction to heat transfer by conduction, convection and radiation. When possible, allow each student to further explore thermal science topics of interest.

8. Formal Prerequisites: a C or better in MATH 2435 and PHYS 1444 or equivalents.

9, Class Time and Location: WH 210 Monday Wednesday Friday 8:00 – 8:50 AM

10. Course Outline:

Part I, Thermodynamics:

1. Basic Concepts of Thermodynamics and Properties of Pure Substances
properties of matter, systems, control volumes, forms of energy, processes, phase changes, P, v, T diagrams, work and heat, heat capacity, zeroth law of thermodynamics
2. First Law of Thermodynamics:
conservation of energy for closed and open systems, Bernoulli's equation, polytropic process
3. Second Law of Thermodynamics:
efficiency, irreversibilities, entropy, entropy indestructible, Clausis statement, PPM, T,s diagram,

----*Exam*----

Part II, Heat Transfer:

1. Steady and Transient Heat Conduction
Fourier equation, thermal resistance, lumped system, simple transient heat conduction, insulation
2. Forced and Natural Heat Transfer by Convection
fins, pipes, plates, dimensionless numbers
3. Heat Transfer by Radiation
black bodies, radiation resistance

----*Exam*----

Cycle project (Required for AE)
Optional Comprehensive Final Exam

11. Grading System

Weighting: Homework Assignments 10%
Quizzes (6-7) 30%
Scheduled Exams (2) 60%
Final Examination (Comprehensive and Optional) will replace one exam score (30%)
Cycle Project 5% extra credit

Letter Grade/Number Grade correlation:
A (90-100), *B* (80-89), *C* (70-79), *D* (60-69), *F* (less than 60, fail class)

12. Expectations of Students:

Attendance: Students are expected to attend all classes.

The Textbook: All Students are expected to have access to the assigned textbook. The textbook contains valuable reading material, example problem solutions, and many of the problems assigned as homework. The first edition of the textbook is organized differently and will not serve a student's needs for this class.

Homework Assignments: Homework will be assigned daily and is due at the beginning of the next class meeting. No homework turned in after solutions are posted online will receive any grade other than zero. All homework handed in for grade will include a statement of the problem and, in the case of problems requiring calculations, a sketch labeled with all relevant information. The statement of the problem will be followed by a neatly written and organized solution to the problem with the answer outlined by a box. Any Extra Credit assignments are expected to be as organized and neat as expected for the homework.

Quizzes: Six or seven formal quizzes will be given at the beginning of a class upon the completion of each major topic. All cell phones and other communication devices must be switched off and remain out of sight in a closed backpack or purse. The lowest quiz score will be excluded from the quiz average.

Exams: Two full period exams are planned for the course, the first over thermodynamics and the second over heat transfer. There will be **NO** make-up exams (see Final Exam below). During both the 1.5 hour exams and the final exam, 1) plan to not leave the room until you have turned in your completed exam and 2) all communication devices must be switched off and remain out of sight in a closed backpack or purse. NOTE: If you wish to contest the grading of any exam, the exam must be presented in the newly graded condition: do not write anything on a graded exam until you are satisfied that you received all appropriate credit for your work.

Quiz and Exam Preparation: Students may write anything they want on one 5"x8" index card (same one card to be used throughout the course) and refer to this card for exams and most quizzes.

Final Exam: An optional, comprehensive final examination will be given at the conclusion of the course. If you choose to take the final exam, its score will replace one missed exam, or the lower exam grade (only to raise your final grade).

Notes to Student: You (or someone else on your behalf) are paying the university to teach you about thermal engineering; payment to this university does not guarantee you credit in any course, nor a degree. This thermal engineering course is essentially two courses in one and many concepts will be covered and applied to idealized situations in a short period of time: student effort will be required to absorb the material presented. Copying work required for course credit from any source rarely increases your knowledge of the subject being studied and is discouraged by penalties that can include a zero for the work turned in, an F in the course, or possible dismissal from the university.

As the instructor for this course, I reserve the right to adjust the course in any way that serves the educational needs of the students enrolled in this course. – Kathy J. Hays-Stang

University Policies:

Academic Integrity: All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Instructors may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents' Rule 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) 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 from the University.

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://wweb.uta.edu/ses/fao).

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 can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

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 visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

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.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

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.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is to the left when you exit the classroom. At the end of the west end of the hall, turn left, go down the stairs and outside. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals. **Emergency Procedures for Disabled Personnel:** If the disabled person cannot safely evacuate the building, one person should stay with the disabled individual while another person reports his/her location to the University Police. Hearing impaired and visually impaired persons need only one person each to notify them of a fire alarm or guide them to safe escape routes during an evacuation. After evacuating employees and students have cleared all stairways, disabled persons should be assisted to the stairwell landings to await emergency personnel. All doors to the stairwells must be kept closed during this time. NOTE: Environmental Health & Safety would like to offer the following reminders to those who are disabled or have special needs: Take control without depending on others to take the first step. Don't be afraid to let others know you need assistance. Don't hesitate to communicate what your special needs are in order to make the evacuation easier and safer for you and for your assistants. Communicate with those who can help as soon as you are able by dialing 3003 to campus Police. Speaking with someone over the telephone will help to keep you calm. Don't delay your evacuation or communication to evacuate. Plan ahead. Be prepared. Know what you are going to do before an emergency arises. Make a plan and then test it. Determine what your alternatives are. When you enter an unfamiliar building, look it over and locate the most available telephones, note horizontal exits and ramps, note exit signs and enclosed stairwells determine if landings are large enough), note rooms that would make good areas of refuge, and note the location of fire alarm pull stations. ***Never take an elevator in a building on fire.***