

**MEET 3990 APPLIED THERMODYNAMICS**

Fall 2018

3 credit hours, Tu Th 4:00-5:20 p.m. NTDP B155

Instructor        Dr. Huseyin Bostanci  
Office             NTDP F115L  
Office Hours     Tu Th 10:00 a.m. - 12:00 p.m. (other times by appointment)  
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**Course Description**

Principles of energy balance and substance behavior as related to different engineering systems. Topics include gas laws, laws of thermodynamics, relationship between thermodynamics variables, thermodynamic tables and charts, power cycle and various applications. Pre-Requisites: CHEM 1410/1430, MATH 1720, PHYS 1710/1730. MEET 3990 is a required course in MEET program.

**Course Learning Outcomes** (ETAC of ABET program outcomes addressed)

Upon successful completion of this course, students will be able to:

1. Understand fundamental thermodynamics properties, and convert different systems of units. (1)
2. Calculate properties of pure substances. (1)
3. Conduct energy analysis for closed systems. (1)
4. Conduct mass and energy analysis for control volumes. (1)
5. Describe idealized Carnot heat engines, heat pumps, and refrigerators. (1)
6. Use the concept of entropy to analyze processes. (1)
7. Analyze performance of gas power systems. (1)
8. Analyze performance of vapor power systems. (1)
9. Analyze performance of refrigerators. (1)

**Required Text/Associated Software**

Cengel, Y.A., and Boles, M.A., Thermodynamics, An Engineering Approach, 9<sup>th</sup> edition, McGraw Hill, 2019. ISBN: 978-1-259-82267-4.

**Course Outline**

This is a tentative course outline. Instructor will attempt to follow it closely, and reserves the right to substitute any other relevant material at any point throughout the course.

	Week of	Lecture content
1	08/27/18	Chp. 1,2
2	09/03/18	Chp. 2,3
3	09/10/18	Chp. 3
4	09/17/18	Chp. 4
5	09/24/18	Chp. 4, Review (Chp. 1-4)
6	10/01/18	<b>Exam 1</b> (Chp. 1-4), Chp. 5
7	10/08/18	Chp. 5,6
8	10/15/18	Chp. 6,7
9	10/22/18	Chp. 7
10	10/29/18	Chp. 7,9
11	11/05/18	Chp. 9, Review (Chp. 5-9)
12	11/12/18	<b>Exam 2</b> (Chp. 5-9), Chp. 10
13	11/19/18	Chp. 10
14	11/26/18	Chp. 10,11
15	12/03/18	Chp. 11, Review (all chps.)

Chp.	Topic
1	Introduction and Basic Concepts
2	Energy, Energy Transfer, and General Energy Analysis
3	Properties of Pure Substances
4	Energy Analysis of Closed Systems
5	Mass and Energy Analysis of Control Volumes
6	The Second Law of Thermodynamics
7	Entropy
9	Gas Power Cycles
10	Vapor and Combined Power Cycles
11	Refrigeration Cycles

Final Exam (all chps.) 12/13/18 Th 1:30 - 3:30 p.m.

### Grading Criteria

Quizzes (announced, total of 4)	20%
Midterm Exams (total of 2)	50%
Final Exam	30%
Homework	up to 5% (Bonus)
Attendance and Participation	up to 5% (Bonus)

### Expected Grade Distribution

A: ≥90%, B: 80-89%, C: 65-79%, D: 50-64%, F: <50%

### Policies and Procedures

1. This syllabus is subject to change during the semester with changes to be announced in class.
2. This course provides opportunities for students to take advantage of several software packages supported by the department in the classroom or in lab experiments, in simulation studies, homework assignments, or in projects.
3. The course website, Blackboard Learn, at <https://learn.unt.edu/> will be used for posting course materials, assignments, and grades, as well as for email communications. Students are encouraged to check the course website often.
4. Homework will be assigned regularly including selected problems from the textbook. Homework has to be submitted on time –on the designated class day (Tuesday or Thursday) at the beginning of class (4:00 p.m.)- for grading. Late submissions will get zero grade. The lowest grade from the homework assignment will be dropped when calculating the average grade at the end of the semester.
5. A total of 4 short quizzes will be given at the previously announced dates during class time.
6. For all classes, cell phones must be silenced. For exams, cell phones must be placed in backpacks and left at the front of the classroom.
7. Exams will be in the open textbook format. Additionally, students can only use a scientific calculator, pencils, and erasers. No other electronics, notes/notebooks are allowed.
8. Grades are based in part on the student's ability to communicate. You must present your entire solution in an orderly way for each problem. Full grade points will be assigned only on the correct final answers with correct steps. You must show complete process of your solution. Partial credits will be assigned for correct steps taken towards the solution.

9. Requests for the review of a graded exam/assignment must be made within one week of the grade announcement. Upon review, the exam/assignment score may increase, remain the same, or decrease.
10. There will be no make-up exams or assignments unless you have a documented, university-excused absence. If you know in advance that you will miss an exam, you must contact instructor before the scheduled exam.
11. An "I" (incomplete) grade is given only for extenuating circumstances and in accordance with University and Departmental Policies.
12. The instructor reserves the right to change the grade distribution at the end of the semester. If any changes occur, the changes will be less stringent than the distribution above.
13. **Academic Integrity Standards and Sanction for Violations:** According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University. Any violation of academic honesty in an exam or assignment will result in a grade of zero and a report to <https://facultysuccess.unt.edu/academic-integrity>.
14. **Acceptable Student Behavior:** Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at [deanofstudents.unt.edu/conduct](http://deanofstudents.unt.edu/conduct).
15. **Access to Information- Eagle Connect:** Students' access point for business and academic services at UNT is located at: [my.unt.edu](http://my.unt.edu). All official communication from the University will be delivered to your Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward e-mail: [eagleconnect.unt.edu/](http://eagleconnect.unt.edu/).
16. **ADA Statement:** UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website at [disability.unt.edu](http://disability.unt.edu).
17. **Attendance Policy:** Engagement, participation and interaction are important elements of the learning process. To that end, we will be using an online polling tool, iClicker Cloud, so each student must be registered and have a device (computer, smartphone or tablet) for polling responses for this course (please carefully follow the registration instructions posted at the Blackboard Learn). You will receive 1 point for each answer recorded (participation) and an additional 1 point for each correct answer for a total of 2 points per polling/class meeting. Therefore, you are receiving credit for participating and additional credit for answering correctly. The total number of points that you can earn during the semester is capped at 50 (corresponding to 5% bonus grade as described). Since you will have the opportunity to answer more questions than are required to reach 50, you can still build 50 points even if you miss a couple of classes or answer some questions incorrectly. Because you will be given more

than 50 points worth of polling questions throughout the semester, you may not make up missed questions, regardless whether you have forgotten to bring a response device, you are late to class, or you miss class. Again, there is no makeup for missed questions (if you have extenuating circumstances, please notify the instructor).

\*Please note that the misuse of iClicker Cloud will be considered a violation of proper student conduct and will be treated as cheating. For this class, iClicker Cloud is to be used as a learning tool by you in the classroom. Misuse would include submitting answers for a friend who is not in attendance in class, submitting answers when you are absent, having someone else submit answers for you when you are absent, or any other use of iClicker Cloud by which you are not submitting your own work in class.

18. **Emergency Notification & Procedures:** UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.
19. **Retention of Student Records:** Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Blackboard online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their individual record; however, information about students' records will not be divulged to other individuals without proper written consent. Students are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University's policy.
20. **Student Perceptions of Teaching Effectiveness (SPOT):** Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during weeks 13 and 14 of the long semesters to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" ([no-reply@iasystem.org](mailto:no-reply@iasystem.org)) with the survey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the spot website at [www.spot.unt.edu](http://www.spot.unt.edu) or email [spot@unt.edu](mailto:spot@unt.edu).