MEET 3990 APPLIED THERMODYNAMICS

Summer 2019
3 credit hours, Tu Th 8:00-9:50 a.m. NTDP F185

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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

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.

<table>
<thead>
<tr>
<th>Week of</th>
<th>Lecture content</th>
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<tbody>
<tr>
<td>1 06/03/19</td>
<td>Chp. 1, 2</td>
</tr>
<tr>
<td>2 06/10/19</td>
<td>Chp. 2, 3, Quiz 1</td>
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<td>3 06/17/19</td>
<td>Chp. 4</td>
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<tr>
<td>4 06/24/19</td>
<td>Chp. 4, Exam 1 (Chp. 1-4)</td>
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<td>5 07/01/19</td>
<td>Chp. 5</td>
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<tr>
<td>6 07/08/19</td>
<td>Chp. 6, 7, Quiz 2</td>
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<td>7 07/15/19</td>
<td>Chp. 7, 9</td>
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<td>8 07/22/19</td>
<td>Chp. 9, Exam 2 (Chp. 5-9)</td>
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<tr>
<td>9 07/29/19</td>
<td>Chp. 10</td>
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<td>10 08/05/19</td>
<td>Chp. 11</td>
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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 (Chp. 10-11) 08/09/19 Fr 8:00-10:00 a.m.
Grading Criteria

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Quizzes (announced, total of 2)</td>
<td>25%</td>
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<tr>
<td>Midterm Exams (total of 2)</td>
<td>50%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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Expected Grade Distribution
A: ≥90%, B: 75-89%, C: 60-74%, D: 50-59%, 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, Canvas, at https://canvas.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. Doing homework individually and then discussing in a group setting is very beneficial to better understand the material and prepare the exams. Homework will not be collected for grading.
5. A total of 2 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.

15. **Access to Information- Eagle Connect**: Students’ access point for business and academic services at
UNT is located at: 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/.

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.

17. **Attendance Policy**: Attendance to the fullest extent possible is highly encouraged as engagement,
participation and interaction are important elements of the learning process. However, attendance will
not be taken during lectures, and will not be considered as part of the final grade calculation.

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) 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 or email spot@unt.edu.