

UNIVERSITY OF NORTH TEXAS – Mechanical and Energy Engineering
MEEN 2210/MEET 3990 **THERMODYNAMICS I/APPLIED THERMODYNAMICS**
SYLLABUS Summer 2022 3 Credit hours

Instructor: Dr. Hassan Qandil (hassan.qandil@unt.edu)

Office Hours: By appointment via Zoom.

Lecture & Location: MW 8:00 am to 9:50 am NTDP B185

Teaching Assistant: TBD

TA Office Hours: Via Email or Zoom Meetings.

Pre-requisite:

MEEN: Must complete Math 1720 and Phys 1710 with a grade of C or better.

MEET: Must complete Chem 1410/1430 and ENGR 2332 with a grade of C or better.

Catalog Course Description:

Thermodynamics is a fundamental mechanical engineering course for lower-level undergraduate students. This course will provide basic skills and knowledge to solve various classical macroscopic thermodynamic engineering problems. Specifically, throughout this course students can:

- (1) Understand the basic concepts of thermodynamic properties including temperature, pressure, volume, enthalpy, entropy, internal energy, and specific heat
- (2) Understanding the concept of work and energy transfer by heat
- (3) Apply the first law of thermodynamics and understand the concept of energy
- (4) Apply the control volume concept to analyze engineering systems such as turbines, heat exchangers, pump, etc.
- (5) Apply the second law of thermodynamics to analyze the thermodynamic cycle performance

Required Text:

“Fundamentals of Engineering Thermodynamics”, 9th edition (2020), M.J. Moran, H.N. Shapiro, D.D. Boettner, M.B. Bailey. Wiley, ISBN: 978-1119721437.

ABET Criteria:

Upon completion of this course, the student should be able to:

- Demonstrate ability to formulate the first and second law of thermodynamics;
- Demonstrate ability to identify, formulate, and solve engineering problems;
- Understand concepts of the First Law of Thermodynamics;
- Understand the concept of work and energy transfer by heat;
- Understand concepts of the Second Law of Thermodynamics;
- Demonstrate ability to evaluate and work with thermodynamic properties;
- Demonstrate ability to use control volume analysis for various engineering applications.
- Understand failure criterion for designs

ABET EAC Student Outcomes (SO):

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. An ability to communicate effectively with a range of audiences;
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

MEEN 2210 CLO	ABET EAC Student Outcomes						
	1	2	3	4	5	6	7
i	X						
ii	X			X			
iii	X						
iv	X						
v	X						
vi	X						
vii	X						

CALCULATORS: only calculator approved for course are those permitted on (FE) exam. No graphing calculators.

- 1) Hewlett Packard—HP 33s and HP 35s models, but no others.
- 2) Casio—All fx-115 and fx-991 models. Any Casio calculator must contain fx-115 or fx-991 in its model name.
- 3) Texas Instruments: All TI-30X and TI-36X models. Any TI calculator must contain either TI-30X or TI-36X in its model name.

GRADES: Standard grading scale used: 90/80/70/60. Re-grade request must be made in class the day returned. No re-grade requests after class dismissed. Entire exam will be re-graded, which may result in lower score than originally assigned. Make-up NOT allowed only exception being University excused absences with documentation provided.

Attendance 5% **Taken In-class** (Extra credit for lecture participation)
 Homework 20% **Online PDF submissions**, problem solving / critical thinking
 Quizzes 20% **In-class**, problem solving, like home practice
 Mid Term 25% **In-class**, reading comprehension / multiple choice / qualitative
 Final Exam 30% **In-class**, reading comprehension / multiple choice / qualitative
Extra Credit is available in class, and through exams and quizzes

TENTATIVE LECTURE SCHEDULE

Week	Dates	Chapter	Topic	Quiz
1	Jun. 6 th – Jun. 10 th	1	Intro	
2	Jun. 13 th – Jun. 17 th	2	Energy & First law	
3	Jun. 20 th – Jun. 24 th	2,3	Energy & First law, Evaluating properties	1
4	Jun. 27 th – Jul. 2 nd	3	Evaluating properties	
5	Jul. 4 th – Jul. 8 th	No class July 4th Midterm (Wed. July 6th, In-class. same class time) (Ch: 1-3)		
6	Jul. 11 th – Jul. 15 th	4	Control volume analysis	
7	Jul. 18 th – Jul. 22 nd	5	Second law	2
8	Jul. 25 th – Jul. 29 th	5	Second law	
9	Aug. 1 st – Aug. 5 th	6	Entropy	3
10	Aug. 8 th – Aug. 12 th	6	Entropy	
Final (Friday, Aug 12th, In-class. same class time) (COMPREHENSIVE)				

COURSE POLICY: **Course delivery method is in-person.** All **course announcements, lecture notes, recorded material and assignments** will be posted on the MEEN 2210 / MEET 3990 Canvas courses. **Students are expected to have access to the textbook on their own.**

HOMEWORK: All **Homework submissions are online** through CANVAS and in a PDF format. **NO LATE SUBMISSIONS ALLOWED** except for students with UNT-approved excuse.

EXAMS: All **quizzes and exams will be in-class.** If needed due to COVID-19 emergency regulations, exams may transition to CANVAS format using a LockDown browser and Respondus Monitor, which required that the student have access to a webcam and a microphone. For more details, refer to the following link: <https://clear.unt.edu/supported-technologies/respondus-lockdown-browser> (Links to an external site.)

FACE COVERINGS: UNT encourages everyone to wear a face covering when indoors, regardless of vaccination status, to protect yourself and others from COVID infection, as recommended by current CDC guidelines. Face covering guidelines could change based on community health conditions.

ATTENDANCE: Students are expected to attend class meetings regularly and to abide by the attendance policy established for the course. It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Please inform the professor and instructional team if you are unable to attend class meetings because you are ill, in mindfulness of the health and safety of everyone in our community.

If you experience any symptoms of COVID-19 (<https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Team at COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure.

[IF NEEDED] COURSE MATERIALS FOR REMOTE INSTRUCTION: Remote instruction may be necessary if community health conditions change or you need to self-isolate or quarantine due to COVID-19. Students will need access to a webcam and microphone to participate in fully remote portions of the class. Information on how to be successful in a remote learning environment can be found at <https://online.unt.edu/learn>

ACADEMIC INTEGRITY STANDARDS AND SANCTIONS FOR VIOLATIONS: According to UNT Policy 06.003, 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. Academic dishonesty will not be tolerated and will result in zero assignment score and reported to Office of Academic Integrity. No exceptions. Having any calculator not on the approved list is a violation of Academic Integrity.

ADA Policy: 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 (<https://disability.unt.edu/>).

STUDENT PERCEPTIONS OF TEACHING EFFECTIVENESS (SPOT) Course participates in SPOT evaluations (<http://spot.unt.edu/> or email spot@unt.edu).

RETENTION OF STUDENT RECORDS Course follows Family Educational Rights and Privacy Act (FERPA) laws and UNT Policy 10.10, Records Management and Retention.

SYLLABUS CHANGES Instructor reserves right change syllabus. Any changes announced in class and posted to CANVAS with an accompanying email to student's UNT email address.

ACCEPTABLE 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. To learn more, visit UNT's Code of Student Conduct (<https://deanofstudents.unt.edu/conduct>).

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 a student's Eagle Connect account. For more information, please visit the website that explains Eagle Connect and how to forward e-mail Eagle Connect (<https://it.unt.edu/eagleconnect>).