

## Course Title/Number/Section: MEEN 3110-Section 002: Thermodynamics II

### Instructor Information:

Name: Armita Hamidi, PhD (pronouns: she, her, hers)

Email: [armita.hamidi@unt.edu](mailto:armita.hamidi@unt.edu)

Phone: TBD

Office #: F115U

### Office Hours:

Monday & Wednesdays: 2:30 PM to 4:30 PM

or by appointment

#### NOTE:

1. If, for unavoidable reasons, I am unable to hold office hours, I will do my best to notify you in advance and arrange an alternative meeting time.
2. If you cannot attend during scheduled times, feel free to email me to arrange an appointment.
3. **Open Door Policy:** If my door is open and I'm not in a meeting, feel free to stop by no appointment needed.
4. Office hours are a great opportunity to ask questions, clarify course material, and seek support. You are strongly encouraged to take advantage of office hours. Come visit me! I'm here to support you and your success is our goal!

### TA:

Name: TBD

Email: TBD

### Course Description:

Thermodynamics II is the applications of fundamental thermodynamics laws and concepts. Course will discuss exergy analysis , vapor power cycle, gas power system , refrigeration system/cycle, ideal gas mixture and psychrometric applications.

**Pre-requisites:** MEEN 2210-Thermodynamics I.

Credit Hours: 3 credit hours

**Important Note:** Students enrolled in this course are expected to have a solid understanding of the core concepts from **Thermodynamics I**, as they form the foundation for this course. If you find that some of these topics are not yet well mastered, you are strongly encouraged to meet with me or the course TA. We can recommend resources and review strategies to help you reinforce these concepts and be successful in this course.

### Course Delivery:

This is a face-to-face course with learning resources and supplemental materials posted on [Canvas](#). Lesson materials will be organized on the Canvas website for the course. You are expected to have access to the lesson handouts during class by either printing the handouts or having them available for modification on your computer/tablet. The handouts only outline the material for a given class and will need to be completed during class for the student to have the relevant information.

### Class Schedule:

Mon WED: 10:00 AM to 11:20 AM in Room: NTDP D201

**Texts and Materials:**

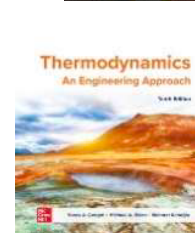
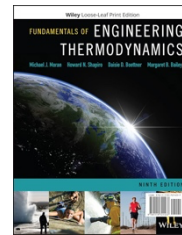
- **Textbook:**

Fundamentals of Engineering Thermodynamics, 9<sup>th</sup>

M. J. Moran, H. N. Shapiro, D. D. Boettner and M.B. Bailey ISBN-13 978-1118412930

Thermodynamics: An Engineering Approach, 10th Edition

Yunus Cengel, Michael Boles and Mehmet Kanoglu  
ISBN13: 9781266664489



- **Technology requirements for courses with digital materials:**

Make sure to have the following items before the first day of class.

- Computer
- Reliable internet access
- Speakers
- Microphone
- Plug-ins
- Microsoft Office Suite
- Canvas Technical Requirements

(<https://clear.unt.edu/supportedtechnologies/canvas/requirements>)

Class Materials for Digital Learning language **must** include the following: This course has digital components. To fully participate in this class, students will need internet access to reference content on the Canvas Learning Management System. If circumstances change, you will be informed of other technical needs to access course content. Information on how to be successful in a digital learning environment can be found at [Learn Anywhere](https://online.unt.edu/learn) (<https://online.unt.edu/learn>).

Make sure you are familiar with Using Canvas, email with attachments, downloading and installing software, spreadsheet programs, presentation and graphics programs.

- **Calculators:**

The use of a calculator is required and allowed on all homework, exams and quizzes. Calculators with graphing capabilities will be allowed in the course for homework and quizzes.

**Use of Artificial Intelligence in this class:**

Generative Artificial Intelligence (GenAI) describes tools, such as ChatGPT, Gemini, and GitHub Copilot, that are trained to generate responses to user-defined prompts or questions. Such tools are a major milestone in machine learning and an impressive application of data science in the real world. Their use can be helpful to your learning but cannot be used to demonstrate mastery of any course objectives.

In this course, I want you to engage deeply with the materials and develop your own critical thinking and writing skills. For this reason, the use of Generative AI (GenAI) tools is not permitted. While these tools can be helpful in some contexts, they do not align with our goal of fostering the development of your independent thinking. Using GenAI to complete any part of an assignment, exam, or coursework will be considered a violation of academic integrity, as it prevents the development of your own skills, and will be addressed according to the [Student Academic Integrity policy](https://policy.unt.edu/policy/06-003) (<https://policy.unt.edu/policy/06-003>).

**Course Objectives:**

**Course Learning Outcomes:**

1. Demonstrate an ability to correctly apply the 1st and 2nd laws of thermodynamics
2. Demonstrate an ability to analyze exergy and exergy destruction for different thermodynamics systems
3. Demonstrate an understanding on how to improve thermal efficiency for different thermodynamics systems based on 1st and 2nd law of thermodynamics
4. Demonstrate an ability to model and analyze various vapor power and gas power cycles/systems
5. Demonstrate an understanding of refrigeration system
6. Demonstrate an understanding of gas mixtures and psychometrics, and be able to analyze A/C systems

MEEN 3110 Course Learning Outcome	ABET Student Outcomes						
	1	2	3	4	5	6	7
1	X						
2	X						
3	X						
4	X						
5	X						
6	X						

**Topics to Be Covered:**

- Second law efficiency and exergy
- Gas power cycles:
- Vapor and combined cycles
- Refrigeration cycles
- Gas-Vapor mixture and air conditioning

**Grading Criteria:**

Homework	15%
Quizzes	15%
Project	5%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Class Attendance	5%
Total	100%

**Letter Grade Assignment**

A  $\geq$  88%; B  $\geq$  70%; C  $\geq$  60%; D  $\geq$  50%; F < 50%

**Course Expectations:**

- **Attendance**

Regular attendance is essential for your success in this course. You are expected to attend every class unless you have a university-excused absence, such as active military service, a religious holy day, or an official university function, as outlined in the [Student Attendance and Authorized Absences Policy \(PDF\)](https://policy.unt.edu/policy/06-039) (<https://policy.unt.edu/policy/06-039>).

Please arrive on time and prepared for each class. Attendance will be recorded. If you must miss class due to an emergency, notify me as soon as possible—preferably before the absence. To receive an excused absence, you must provide satisfactory evidence.

- **Grading**

I am interested in your learning and your approach to problems. Therefore, partial credit will be given when you have solved parts of the problem correctly. Showing your work allows us to assess whether you are on the right track.

- **Assignment**

All assignments must be submitted electronically through Canvas in PDF or word format. Submissions are expected to be neat, well-organized, and clearly readable. Work that is difficult to read, poorly formatted, or disorganized may receive a reduced grade regardless of correctness.

If you anticipate needing additional time of up to 48 hours, you must contact the TA and instructor before the assignment due date to request an extension. Extensions are granted at the instructor's discretion.

Late submissions beyond 48 hours are not accepted, except in cases of UNT-approved excused absences in accordance with UNT Policy 06.039. Assignments submitted late without prior approval will receive a grade of zero.

- **Exams**

Exams are closed-book exams, and you are not allowed to use any electronic devices (including cell phone) other than your computer and calculator. Internet access is not allowed during exams.

You will be allowed to make up a missed exam only if you have a documented university excused absence. If you know in advance that you will miss an exam, you **MUST** contact me before the scheduled exam. Make-up exams will not contain the same questions.

- **Academic Integrity**

Every student in my class can improve by doing their own work and trying their hardest with access to appropriate resources. Students who use other people's work without citations will be violating UNT's Academic Integrity Policy. 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. Please read and follow this important set of [guidelines for your academic success](https://policy.unt.edu/policy/06-003) (<https://policy.unt.edu/policy/06-003>). If you are concerned about how well you are doing in this course, please come speak with me instead of considering academic misconduct.

- **Communication**

The instructor responds to emails within 48 hours during regular business days (Monday–Friday). Messages sent during evenings, weekends, or university holidays may not receive a response until the next business day. At certain points in the semester, email volume may be high; however, student communication is important. If you do not receive a response within two business days, please feel free to send a brief follow-up message as a gentle reminder.

All private communication will be done through your ASU email address. Check frequently for announcements and course updates. In your emails to faculty, include the course name and section number in your subject line.

- **Professionalism**

Professional engineering standards apply in this class. You are expected to demonstrate a behavior consistent with the conduct of an individual practicing in the engineering profession. You are expected to:

- Come prepared for class
- Respect faculty and peers
- Demonstrate responsibility and accountability for your own actions
- Demonstrate sensitivity and appreciation for diverse cultures, backgrounds, and life experiences
- Offer and accept constructive criticism in a productive manner
- Demonstrate an attitude that fosters professional behavior among peers and faculty
- Be punctual to class meetings
- Maintain a good work ethic and integrity
- Recognize the classroom as a professional workplace

I value the many perspectives students bring to our campus. Please work with me to create a classroom culture of open communication, mutual respect, and belonging. All discussions should be respectful and civil. Although disagreements and debates are encouraged, personal attacks are unacceptable. Together, we can ensure a safe and welcoming classroom for all. If you ever feel like this is not the case, please stop by my office and let me know. We are all learning together.

- **Syllabus Update**

This syllabus is subject to change during the semester with changes to be announced in class and provided on Canvas.

### **Academic Support & Student Services:**

Our campus provides extensive academic supports for students, and these supports are there to let students achieve the academic success they are truly capable of. I have provided a list of the academic support offices offered by UNT below:

### **Mental Health**

UNT strives to offer a high-quality education in a supportive environment where you can learn, grow, and thrive. As a faculty member, I am committed to supporting you, and I want to remind you that UNT offers a range of mental health and wellness services to help maintain balance and well-being. Utilizing these resources is a proactive way to support your academic and personal success. To explore campus resources designed to support you, check out [mental health services \(https://clear.unt.edu/student-support-services-policies\)](https://clear.unt.edu/student-support-services-policies), visit [unt.edu/success](https://unt.edu/success), and explore [unt.edu/wellness](https://unt.edu/wellness). To get all your enrollment and student financial-related questions answered, go to [scrappysays.unt.edu](https://scrappysays.unt.edu).

**Technical Assistance:**

**UIT Help Desk:** [UIT Student Help Desk site](http://www.unt.edu/helpdesk/index.htm) (<http://www.unt.edu/helpdesk/index.htm>)

**Email:** [helpdesk@unt.edu](mailto:helpdesk@unt.edu)

**Phone:** 940-565-2324

**In Person:** Sage Hall, Room 130

**Walk-In Availability:** 8am-9pm

**Telephone Availability:**

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

**Laptop Checkout:** 8am-7pm

For additional support, visit [Canvas Technical Help](https://community.canvaslms.com/docs/DOC-10554-4212710328) (<https://community.canvaslms.com/docs/DOC-10554-4212710328>)

**UNT Policies:**

- **Academic Integrity Policy**

Academic Integrity Standards and Consequences. 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. [Insert specific sanction or academic penalty for specific academic integrity violation.]

- **ADA Policy**

The University of North Texas makes reasonable accommodations for students with disabilities. To request accommodations, you must first register with the Office of Disability Access (ODA) by completing an application for services and providing documentation to verify your eligibility each semester. Once your eligibility is confirmed, you may request your letter of accommodation. ODA will then email your faculty a letter of reasonable accommodation, initiating a private discussion about your specific needs in the course. You can request accommodations at any time, but it's important to provide ODA notice to your faculty as early as possible in the semester to avoid delays in implementation. Keep in mind that you must obtain a new letter of accommodation for each semester and meet with each faculty member before accommodations can be implemented in each class. You are strongly encouraged to meet with faculty regarding your accommodations during office hours or by appointment. Faculty have the authority to ask you to discuss your letter during their designated office hours to protect your privacy. For more information and to access resources that can support your needs, refer to the [Office of Disability Access](https://studentaffairs.unt.edu/office-disability-access) website (<https://studentaffairs.unt.edu/office-disability-access>).

- **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.

- **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 Canvas 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 student's 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. See UNT Policy 10.10, Records Management and Retention for additional information.

- **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. Visit UNT's Code of Student Conduct (<https://deanofstudents.unt.edu/conduct>) to learn more.

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 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>).

- **Student Evaluation Administration Dates**

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, 14 and 15 [insert administration dates] 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 (<http://spot.unt.edu/>) or email [spot@unt.edu](mailto:spot@unt.edu).

- **Sexual Assault Prevention**

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT's Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim's compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at [SurvivorAdvocate@unt.edu](mailto:SurvivorAdvocate@unt.edu) or by calling the Dean of Students Office at 940-565- 2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at [oeo@unt.edu](mailto:oeo@unt.edu) or at (940) 565 2759.

**Tentative Course Schedule:**

<b>Week</b>	<b>Date</b>	<b>Lecture Topics</b>	<b>Homework assign date</b>
#1	January 12-14	Overview of syllabus. Review of Thermodynamics Principles Vapor Power Cycles	HW #0 (review)
#2	January 21	Vapor Power Cycles	HW #1 (Vapor Cycles)
#3	January 26-28	Vapor Power Cycles Gas Power Cycles	
#4	February 2-4	Gas Power Cycles	HW #2 (Gas Cycles)
#5	February 9-11	Gas Power Cycles <b>Exam #1</b>	
#6	February 16-18	Gas Power Cycles	
#7	February 23-25	Refrigeration & Heat Pumps	
#8	March 2-4	Refrigeration & Heat Pumps <b>Exam #2</b>	HW #3 (refrigeration and heat pumps)
#9	March 9-11	Spring Break	
#10	March 16-18	Exergy Analysis	
#11	March 23-25	Exergy Analysis	HW#4 (Exergy)
#12	March 30-Apr 1	Exergy Analysis	
#13	Apr 6-8	Gas-Vapor Mixtures & Psychrometric	HW#6
#14	Apr 13-15	Gas-Vapor Mixtures & Psychrometric	HW#6
#15	Apr 20-22	Gas Vapor Mixtures & Air Conditioning Gas Mixtures	
#16	Apr 27-29	Gas Mixtures Review	
#17	<b>May 4-6</b>	<b>Final Exam/ Exam #3</b>	<b>Final Exam Date: Sat May 2nd</b>

**Additional Student Support Services**

- [Registrar](https://registrar.unt.edu/registration) (<https://registrar.unt.edu/registration>)
- [Financial Aid](https://financialaid.unt.edu/) (<https://financialaid.unt.edu/>)
- [Student Legal Services](https://studentaffairs.unt.edu/student-legal-services) (<https://studentaffairs.unt.edu/student-legal-services>)
- [Career Center](https://studentaffairs.unt.edu/career-center) (<https://studentaffairs.unt.edu/career-center>)
- [Multicultural Center](https://edo.unt.edu/multicultural-center) (<https://edo.unt.edu/multicultural-center>)
- [Counseling and Testing Services](https://studentaffairs.unt.edu/counseling-and-testing-services) (<https://studentaffairs.unt.edu/counseling-and-testing-services>)
- [Pride Alliance](https://edo.unt.edu/pridealliance) (<https://edo.unt.edu/pridealliance>)
- [UNT Food Pantry](https://deanofstudents.unt.edu/resources/food-pantry) (<https://deanofstudents.unt.edu/resources/food-pantry>)

**Academic Support Services**

- [Academic Resource Center](https://clear.unt.edu/canvas/student-resources) (<https://clear.unt.edu/canvas/student-resources>)
- [Academic Success Center](https://success.unt.edu/asc) (<https://success.unt.edu/asc>)
- [UNT Libraries](https://library.unt.edu/) (<https://library.unt.edu/>)
- [Writing Lab](http://writingcenter.unt.edu/) (<http://writingcenter.unt.edu/>)