

UNIVERSITY OF NORTH TEXAS – Department of Mechanical Engineering
MEEN 4810-009 / MEEN 5200-001 Principles of HVAC
SYLLABUS Spring 2022 3 Credit hours

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

Office Hours: By appointment via Zoom.

Lectures: TuT 06:30PM - 09:20PM NTDP F175

Teaching Assistant: TBD

TA Office Hours: By appointment via Zoom.

Prerequisite Knowledge:

1. Techniques and applications of derivatives and integrals.
2. Mass conservation in fluid flow.
3. Momentum conservation in fluid flow.
4. Energy conservation in control volume.
5. Viscous flow characteristics.
6. Thermal conduction, convection, and radiation
7. Computational skills using a mathematically functional spreadsheet such as Excel.
8. Understanding programming flow chart.
9. Conduct research using the literature database and web.

Catalog Course Description:

Thermodynamics and psychometrics applied to the HVAC system calculations, energy estimating methods, ducts and piping systems, heat pump and heat recovery systems, air-processing, refrigeration, and heating equipment.

Recommended Textbooks:

- *“Fundamentals of HVACR”*, 4th, Stanfield and Skaves, 2022, Pearson. ISBN13: 9780137574612.
- *“Analysis and Design of Heating, Ventilating, and Air-Conditioning Systems”*, 2nd, Stanford and Spach, 2019, CRC Press. ISBN13: 9780429890871.
- *“ASHRAE Handbook Fundamentals 2017”*, ASHRAE, 2017, CRC Press. ISBN13: 9781939200587.

Course Objectives:

- Develop fundamental understanding of the objectives and principles of heating, ventilating, and air conditioning with emphases on the application of theories of thermodynamics, fluid mechanics, and heat and mass transfer.
- Introduction to HVAC system types and their components.
- Develop the ability to design and analyze HVAC systems.
- Introduction to integrated building design process, and energy modeling for green building system design.

CALCULATORS: Only 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 & fx-991 models. 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-ups are NOT allowed** only exception being University excused absences with documentation provided.

Attendance 5% **Taken In-class** (Extra credit for lecture participation)
 Projects 15% **Online PDF submissions**, real-life problem solving / critical thinking
 Quizzes 20% **In-class**, reading comprehension / multiple choice / qualitative
 Mid Term 30% **In-class**, reading comprehension / multiple choice / qualitative
 Final Exam 30% **In-class**, reading comprehension / multiple choice / qualitative
Extra Credit is available through Exams and Quizzes

TENTATIVE LECTURE SCHEDULE

Week	Dates	Topic	Quiz
1	Jan. 18 th – Jan. 21 st	Introduction + HVAC Science Basics	
2	Jan. 24 th – Jan. 28 th	HVAC Science Basics + Refrigeration Cycle	
3	Jan. 31 st – Feb. 4 th	Refrigeration Cycle + Comfort & Psychrometrics	
4	Feb. 7 th – Feb. 11 th	Fans & Airflow + Ventilation & Dehumidification	
5	Feb. 14 th – Feb. 18 th	Types of AC Systems	1
6	Feb. 21 st – Feb. 25 th	Types of AC Systems	
7	Feb. 28 th – Mar. 4 th	Duct Design & Installation + AC Troubleshooting	
8	Mar. 7 th – Mar. 11 th	Midterm (Tu, Mar 8th) (In-class, same class time)	
9	Mar. 14 th – Mar. 18 th	SPRING BREAK	
10	Mar. 21 st – Mar. 25 th	Envelope System & Load Calculations	
11	Mar. 28 th – Apr. 1 st	Load Calculations	
12	Apr. 4 th – Apr. 8 th	Green Buildings and Systems	
13	Apr. 11 th – Apr. 15 th	Integrated Building Control Systems	
14	Apr. 18 th – Apr. 22 nd	eQUEST Intro	2
15	Apr. 25 th – Apr. 29 th	HVAC Comprehensive Design Process	
16	May. 2 nd – May. 6 th	Final (Tu, May 3rd) (In-class, same class time)	

COURSE POLICY: **Course delivery method is in-person.** All course announcements, lecture notes, recorded material and assignments to be posted on MEEN 5200/MEEN 4810 Canvas courses. **Students are expected to have access to textbooks 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>).