Heat Transfer, MEEN 3210, 001

Instructor Information

Dr. Maurizio Manzo (maurizio.manzo@unt.edu, 940-369-8266) is an Associate Professor in the Department of Mechanical Engineering at the University of North Texas. Dr. Manzo got his Ph.D. from the Southern Methodist University, Dallas, Texas in 2015, and both bachelor's and master's degrees in aerospace engineering from Italy. During his training, he has worked on different research areas of mechanical engineering such as experimental optics, photonics and sensing, and experimental fluid mechanics. He has authored several referred journal papers, conference proceedings, and has 3 US patent, one utility and two provisional. He is a member of the American Society of Mechanical Engineering (ASME), and the American Society for Engineering Education (ASEE).

Course Description, Structure, and Objectives

3 hours. A basic course covers the fundamentals of heat transfer by conduction, convection and radiation, together with applications to typical engineering systems. Topics include one- and Two-dimensional steady state heat conduction, transient heat conduction, internal convection, external convection, and natural convection.

Prerequisite(s): MEEN 3120; MEEN 3110; MEEN 3250 all with a grade of C or better.

Class meetings: Mo We 10:00AM - 11:20AM, F187

Office Hours: Mo 1:00pm - 3:00pm, We 2:30pm - 3:30pm or by appointment. F115G.

Course Learning Outcomes (CLO):

Upon successful completion of this course, students will able to:
1. Understand the basic concepts of heat transfer.
2. Solve steady conduction problems for multilayered and finned geometries.
3. Use thermal circuits method to solve heat transfer problems.
6. Analyze internal and external forced convection for both laminar and turbulent flows.
8. Compute heat transfer quantities (e.g., flow rate, temperatures) in natural convection.
9. Understand the basic theory behind radiation heat transfer.

How to Succeed in this Course

Connect with me through email and/or by attending office hours. During busy times, my inbox becomes rather full, so if you contact me and do not receive a response within two business days, please send a follow up email. A gentle nudge is always appreciated.

UNT strives to offer you a high-quality education and a supportive environment, so you learn and grow. As a faculty member, I am committed to helping you be successful as a student. To learn more about campus resources and information on how you can be successful at UNT, go to unt.edu/success and explore unt.edu/wellness. To get all your enrollment and student financial-related questions answered, go to scrappysays.unt.edu.

Supporting Your Success and Creating an Inclusive Learning Environment

Every student in this class should have the right to learn and engage within an environment of respect and courtesy from others. We will discuss our classroom's habits of engagement and I also encourage you to review UNT's student code of conduct so that we can all start with the same baseline civility understanding (Code of Student Conduct) (https://policy.unt.edu/policy/07-012).

Required/Recommended Materials

Textbook: Heat and Mass Transfer: Fundamentals and Applications by Cengel, Yunus A. / Ghajar, Afshin J., Edition:6TH 20. Publisher: MCG.
Software: ANSYS

Course Requirements/Schedule

Date	***Topic***	***Assignment***
08/18	*Overview of syllabus*	
08/20	*Introduction and basic concepts*	
08/25	*Heat transfer mechanisms*	
08/27	*Steady state heat conduction*	*Quiz #1*
09/01	*Labor Day*	
09/03	*Concept of thermal resistance*	
09/08	*Thermal resistance network*	*Quiz #2*
09/10	*Heat transfer in fins*	
09/15	*Transient heat conduction*	*HW1*
09/17	*Transient heat conduction*	
09/22	*Recitation*	*Quiz #3*
09/24	*Exam 1 (Heat conduction)*	
09/29	*Introduction to Convection Heat Transfer*	
10/01	*Flow over Flat Plates*	*Quiz #4*
10/06	*Flow across Cylinders and Spheres*	*HW2*
10/08	*Internal Flow general considerations*	
10/13	*Internal Flow general thermal analysis*	*Quiz #5*
10/15	*Internal Flow general thermal analysis*	
10/20	*Natural Convection - introduction*	*HW3*
10/22	*Natural Convection - fin analysis*	
10/27	*Recitation*	*Quiz #6*
10/29	*Exam 2 (Heat convection)*	
11/03	*Heat exchangers - introduction*	
11/05	*Heat exchangers - analysis considerations*	*HW4*
11/10	*Heat exchangers - analysis methods*	
11/12	*Recitation*	*Quiz #7*
11/17	*Exam 3 (Heat exchangers)*	
11/19	*Radiation heat transfer - introduction*	
11/24	*Thanksgiving*	
11/26		
12/01	*Radiation heat transfer – intensity*	*HW5*
12/03	*Recitation/final discussions*	*Quiz #8*
12/06	*Final Exam, comprehensive (it includes ANSYS); 8:00 am-10:00 am F 187*	

Students will be notified by Eagle Alert if there is a campus closing that will impact a class and describe that the calendar is subject to change, citing the Emergency Notifications and Procedures Policy (https://policy.unt.edu/policy/06-049).

Assessing Your Work

A = 81-100
B = 71-80
C = 61-70
D = 51-60
F = 0-50

Assignment	***Percentage of Final Grade***
Exam 1	*20%*
Exam 2	*20%*
Exam 3	*20%*
Quiz/other activities	*20%*
Homework	*10%*
Final Exam (not mandatory)	*Replaces one exam*
Attendance	*10%*
Total Points Possible	*100%*

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. Please read and follow this important set of guidelines for your academic success (https://policy.unt.edu/policy/06-003). If you have questions about this, or any UNT policy, please email me or come discuss this with me during my office hours.

Attendance and Participation

Punctuality is important for maintaining a respectful and productive learning environment. Students are expected to arrive on time for each class session. Habitual tardiness can disrupt the flow of the class and negatively impact your learning and that of your peers. If you arrive late, please enter quietly and take a seat near the door to minimize disruption. Repeated tardiness may result in a deduction of participation points or other penalties as outlined in the course grading policy.

Late Work Submission Policy

Assignments are expected to be submitted by the specified deadline. Late submissions can disrupt the grading process and delay feedback for the entire class. Therefore, the following policy will be enforced for late work:

- **0-24 hours late:** 10% deduction from the total possible points.
- **24-48 hours late:** 20% deduction from the total possible points.
- **48-72 hours late:** 30% deduction from the total possible points.
- **More than 72 hours late:** The assignment will not be accepted, and a grade of zero will be recorded.

Exceptions to this policy may be made in cases of documented emergencies or extenuating circumstances, which must be communicated to the instructor as soon as possible. Extensions must be requested in advance, not after the deadline has passed.

Accommodations

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable 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 reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (https://studentaffairs.unt.edu/office-disability-access). You may also contact ODA by phone at (940) 565-4323.

UNT HONOR CODE

https://policy.unt.edu/sites/default/files/07.012_CodeOfStudConduct.Final8_.19.format_0_0.pdf

Use of AI Tools in MEEN 3210

The use of AI tools (e.g., ChatGPT, Copilot, Gemini) can be beneficial for generating ideas, summarizing concepts, or assisting with writing, but they must be used responsibly, ethically, and in alignment with course learning objectives.

1. Permission Levels

For each assignment, the problem statement will indicate one of the following categories:

- Explicitly Allowed – AI tools may be used for brainstorming, proofreading, grammar/style refinement, summarization, generating ideas/outlines, or coding assistance, provided all AI contributions are disclosed.
- Limited Use – AI may be used for conceptual explanations or tutoring assistance, but not for generating entire solutions, essays, or problem sets unless specifically permitted.
- Prohibited – AI-generated content must not replace original student work in assignments requiring personal reflection, analytical reasoning, problem-solving, or research synthesis. AI use during exams or quizzes is strictly forbidden.

2. Documentation Requirement

If you use AI for any part of your work:

1. Include an AI usage disclosure statement at the end of your submission.
   Example (Basic Acknowledgment):

   "I used ChatGPT to help refine the organization of my homework. All content, calculations, and ideas are my own."

2. For substantial AI input, use a Detailed or Reflection-Based acknowledgment:
   - Detailed – Tool used, purpose, type of output, and modifications made.

    - Reflection-Based – In addition to the above, reflect on how AI shaped your learning and what you verified independently.
3. Failure to disclose AI usage may be considered academic dishonesty under UNT's Academic Integrity Policy and could result in grade penalties or referral for review.

3. Ethical & Accuracy Expectations

- AI is a learning aid, not a substitute for your own understanding.
- You are responsible for verifying technical accuracy of AI-generated content.
- Cross-check AI outputs with the textbook, lecture notes, or reputable sources before submission.

4. Consequences for Misuse

If AI is used in violation of the assignment's permission level, or without disclosure:

1. Revision required with proper attribution.
2. Grade penalty of up to -20% for undisclosed AI use.
3. Referral to academic integrity review for repeated violations.
4. Restorative options may include writing a reflection on responsible AI use or completing an alternate assignment.

5. Why This Policy Exists

The goal is to help you develop critical thinking, problem-solving, and engineering judgment while learning to use emerging tools appropriately. Using AI responsibly will prepare you for professional practice where such tools are common but must be applied with care.