HEAT TRANSFER (MEEN 3210)
Fall 2026

Instructor: Prof. Richard Zhang Contact: zihao.zhang@unt.edu Office: Discovery Park F115V	Lectures: MW 9:05 – 10:25 AM Office Hours: MW 10:30 – 11:30 AM Classroom: Discovery Park F187

Textbook:

Required: T. L. Bergman, A. S. Lavine, F. P. Incropera & D. P. DeWitt, Fundamentals of Heat and Mass Transfer, 8th Edition Wiley, ISBN-13: 978-1-119-35388-1

Supplemental: J. H. Lienhard IV & J. H. Lienhard V, A Heat Transfer Textbook, 5th Edition Phlogiston, URL: <https://ahtt.mit.edu>

Course Prerequisites:

- MEEN 3120 Fluid Mechanics
- MEEN 3110 Thermodynamics II
- MEEN 3250 Analytical Methods (co-requisite)

Course Description:

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, natural convection, and radiation heat transfer.

Grading and Assignment Distribution:

A: 85% – 100%	Homework: 15%
B: 70% – 84.9%	Group Assignments: 15%
C: 55% – 69.9%	Midterms: 20% each
D: 40% – 54.9%	Final Exam: 30%
F: 39.9% and below	Total: 100%

General Rules:

(1) Please come to the classroom on time.
(2) Loss in assignment grade associated with lateness will not be made up.
(3) Bring a physical copy of the textbook or the e-book to every lecture.
(4) While not strictly graded, participation in lecture Q&A enhances interest and fun of learning.
(5) Review the materials covered/taught in the previous lecture before coming to class.
(6) Review Laws of Thermodynamics and its application to conservation of energy.
(7) Review Fluid Mechanics, particularly boundary layers flows in internal and external bodies.
(8) Refresh your background on Calculus and Ordinary Differential Equations.
(9) Get familiar with using and the practice of scientific notation, unit analysis, and fast math.

(10) If you do not feel well or need accommodations for lectures, assignments, and other matters, please notify the instructor or TA at the soonest possible time.

Homework:

(1) Please upload your homework as a .PDF file on Canvas. Homework can be turned in earlier than the due date. Homework due dates are always on **Fridays at 11:59 PM**. Physical copies of homework are not accepted. You are responsible for digitally scanning homework with sufficient resolution, size, and image quality. You may use a scanner, copier, or a phone app.
(2) Exceptions to the homework due date may be granted for medical emergencies, severe weather events, sporting commitments, work-related travel, weddings, jury duty, military duty, and other official matters. An official documentation must be emailed to the instructor.
(3) Not having a textbook is not a valid excuse for not doing your homework. It is the student's responsibility to acquire textbook for his/her study and bring to the classroom.
(4) You may work together with other students for homework, but your homework submission must be an original document, not identical to another student's submission.

Group Assignments:

(1) In-class group assignments are open book, open notes, open everything. They must be done in a team consisting between 2 to 3 students. One submission per team. Group assignments are in-class only, typically between 10 to 15 minutes long. They are submitted on paper to the instructor or TA at the end of lecture. Assignments handed in after lecture are not graded.
(2) There are no make-ups for in-class group assignments. Group members must be present in lecture to receive credit.

Exams:

(1) Midterm exams and the final exam are held in class. No teamwork and communication.
(2) Formula sheets, relevant graphs and tables are provided with your exam packet. Turn in exam packet and keep formula sheets and tables for your own reference.
(3) Basic scientific calculators and graphing calculators are allowed during exams. Cell phone calculators are not allowed.
(4) There will be no make-up exams. Students who need to request rescheduling of exams must notify the instructor at least 7 days in advance of the exam date.

Disability Accommodations: If you need academic accommodations for disabilities, you must provide proper documentation at least 7 days in advance of the exam date which verifies the disability and makes you eligible for accommodations, then you can schedule an appointment with the instructor to make appropriate arrangements. For more information, please refer the Office of Disability Accommodation (ODA) website at https://disability.unt.edu/

Academic Dishonesty: A zero tolerance policy for academic misconduct will be enforced. First-time offenses will be reported to the Office of Academic Integrity and will result in either a grade penalty or failure of class, depending on severity.

ABET Student Learning Outcomes (SO)

(1) ***An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics***

MEEN 3210 Course Learning Outcomes	ABET EAC Student Outcomes						
	1	2	3	4	5	6	7
Apply conservation of mass, momentum, and energy to heat transfer problems.	X						
Understand the concepts of one-dimensional steady-state heat conduction	X						
Understand the concepts of multi-dimensional steady-state heat conduction	X						
Understand the concepts of transient heat conduction	X						
Use thermal Ohm's law (thermal circuits) to solve heat transfer problems	X						
Understand the concepts of internal forced convection for both laminar and turbulent flows	X						
Understand the concepts of external forced convection for both laminar and turbulent flows	X						
Understand the concepts of natural convection	X						
Understand the basic theory behind radiation heat transfer	X						

Disclaimer: The course schedule, content, and assignments are subject to modification when circumstances dictate and as the course progresses. If changes are made, due notice will be given.

MEEN 3210 Fall 2026 Schedule

Week 1 (8/17-8/21)
M Overview of syllabus Ch 1.1-2: Introduction
W Ch 1.3-4: Intro. to heat transfer: Conduction, Convection, and Radiation
Week 2 (8/24-8/28)
M Ch 1.4-5: Intro. to heat transfer: Thermodynamics and Energy Balance
W Ch 2: Intro. to Conduction: Thermal Conductivity
Week 3 (8/31-9/4)
M Ch 2: Heat Diffusion Equation
W Ch 3.1-3: 1D Steady-State Conduction: Plane Wall and Cylinder
Week 4 (9/7-9/11)
M *Labor Day – No Class*
W Ch 3.2-4: 1D Steady-State Conduction: Thermal Circuit Method
Week 5 (9/14-9/18)
M Ch 3.5: 1D Steady-State Conduction: Heat Generation
W Ch 3.5: 1D Steady-State Conduction: Heat Generation
Week 6 (9/21-9/25)
M Ch 3.6: 1D Steady-State Conduction: Extended Surfaces/Fins
W Ch 3.6: 1D Steady-State Conduction: Fin Arrays Content
Week 7 (9/28-10/2)
M Ch 4: Concepts in 2D Conduction / Review of Midterm 1
W **In-Class Midterm 1 (Chapters 1.1-3.6)**
Week 8 (10/5-10/9)
M Ch 5.1-3: Transient Conduction: Lumped Capacitance Method
W Ch 5.4: Transient Conduction: One-Term Approximation

Week 9 (10/12-10/16)
M Ch 5.7: Transient Conduction: Semi-Infinite Solid
W Ch 6.1-7: Intro. to Convection: Convection Equations
Week 10 (10/19-10/23)
M Ch 7.1-3: External Flow: Flat Plate in Parallel Flow, and Methodology
W Ch 7.4-5: External Flow: Flow Across Cylinders & Spheres
Week 11 (10/26-10/30)
M Ch 8.1-2: Internal Flow: Hydrodynamic & Thermal Considerations
W Ch 8.3: Internal Flow: Energy Balance
Week 12 (11/2-11/6)
M Ch 8.4-6: Internal Flow: Convection Correlations
W Ch 9: Free Convection
Week 13 (11/9-11/13)
M Ch 9: Free Convection / Review of Midterm 2
W **In-Class Midterm 2 (Chapters 1-3, 5-9)**
Week 14 (11/16-11/20)
M Ch 11: Heat Exchangers
W Ch 12.1-2: Radiation Processes and Properties: Fundamentals
Week 15 (11/23-11/27)
Thanksgiving Break – No Class
Week 16 (11/30-12/4)
M Ch 12.4-6: Radiation Processes and Properties: Real Surfaces
W Ch 13.1-2: Radiation Circuit Method / Review of Final Exam Content
Week 17 (12/7-12/11)
M **Final Exam 12/7 8:00 – 10:00 AM (Cumulative: 1-3, 5-9, 11-13)**