

Instructors:	Richard Zhang	Vish Prasad
Lecture Times:	M&W 10:00 am – 11:20 am	M&W 5:30 pm – 6:50 pm
Classroom:	DP B140	DP D215
Email:	zihao.zhang@unt.edu	vish.prasad@unt.edu
Instructor Office Hours:	M&W: 1:00 pm – 3:00 pm	TBA
Office:	DP Library / TBA	DP F101Q
Recitation Sessions (TA Reviews and Office Hours): D206A (TA Room)	Karan Kakroo Email: karankakroo@my.unt.edu	

Required Textbook: T. L. Bergman et al, Fundamentals of Heat and Mass Transfer, 8th Edition Wiley, ISBN-13: 978-1-119-35388-1

Course Description:

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, natural convection, and radiation heat transfer.

Pre-requisite: MEEN 3120 Fluid Mechanics

Pre-requisite: MEEN 3110 Thermodynamics II, and

Co/Pre-requisite: MEEN 3250 Analytical Methods

Students outside the MEEN degree program must request instructor's permission to enroll.

Assignment Distribution:

Homework	10%
In-Class Group Assignments	10%
In-Class Quizzes	50%
Final Exam	30%
<hr/>	
Total	100%
Recitation Sessions	+10%
<hr/>	
≥ 85%	A
70-84.9%	B
55-69.9%	C
40-54.9%	D
< 40%	F

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						

Class Policies:

- (1) Please come to the classroom on time. Your classmates will appreciate you wearing a face covering at all times during the lecture.
- (2) Review the materials covered/taught in the previous class before coming to the class.
- (3) Bring a hard copy textbook, or as an e-book to every class.
- (4) Participate in Q&A.
- (5) Review Laws of Thermodynamics and its application to conservation of energy.
- (6) Review fluid mechanics, particularly boundary layers flows: internal and external.
- (7) Refresh your background in calculus and ordinary differential equations.
- (8) Recitation session attendance will count toward homework grade bonus. Students will receive prorated 10% toward their overall grades who attend all sessions.

Homework Policies:

- (1) Please upload your homework as a .pdf file on Canvas. Homework can be turned in earlier than the due date. Physical copies of homework will NOT be collected. You are responsible for digitally scanning homework with sufficient resolution, size, and image quality. You may use a scanner, copier, or photo scanner phone app.
- (2) Exceptions to homework due date: medical emergencies, severe weather events, sporting commitments, work-related travel, weddings, jury duty, and military duty. An official documentation or evidence must be submitted to the instructor.

- (3) Having no 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.

Exams and Quizzes:

- (1) Quizzes are open book and open notes. No teamwork. Due at the end of lecture.
- (2) Final exam is only open crib sheet. No teamwork. Due at the end of the session.
 - Crib sheet policy: The formula sheet can include anything from the course, including equations, examples, hand-drawn diagrams, and other inspirational quotes. Anything on the formula sheet that is electronically-produced (pictures, typed words, copy-pastas, etc.) are NOT permitted. You may wish to turn in your hand-written crib sheets with the exam for extra points.
- (3) Calculator Policy: Only graphing calculators are allowed during quizzes and exams. No cell phone calculators.
- (4) There will be no make-up in-class assignments. There will be no make-up exams.
- (5) Students must take the quiz/exam assigned to their enrolled section.

Disability Accommodations: If you need academic accommodations for disability you must provide proper documentation at least one (1) week 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:

There is a zero tolerance policy. Cheating of whatsoever will result in an automatic 'F' in this course and the matter will be turned over to the appropriate student disciplinary committee.

Disclaimer

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

MEEN 3210 Heat Transfer
Schedule Overview (Subject to change)

<u>Week</u>	<u>Lecture Topics</u>	<u>Homework /Quizzes</u>
#1	Overview of syllabus; Ch 1: Introduction to heat transfer: three modes	
	Ch 1.3-4: Intro. to heat transfer: Thermodynamics	
#2	Ch 1.4-5: Intro. to heat transfer: Energy Balance	
	Ch 2: Intro. to Conduction: Thermal Conductivity, Heat Diffusion Equation	HW1, Q1
#3	<i>Labor Day (No class Sept. 6)</i>	
	Ch 2: Intro. to Conduction: Thermal Conductivity, Heat Diffusion Equation	
#4	Ch 3.1-3: 1D Steady-State Conduction: Plane Wall and Cylinder	Q2
	Ch 3.2-4: 1D Steady-State Conduction: Thermal Circuit Method	HW2
#5	Ch 3.5: 1D Steady-State Conduction: Heat Generation	
	Ch 3.6: 1D Steady-State Conduction: Extended Surfaces/Fins	Q3
#7	Ch 5.1-3: Transient Conduction: Lumped Capacitance Method	
	Ch 5.7: Transient Conduction: Semi-Infinite Solid	HW3
#8	Ch 12.1-2: Radiation Processes and Properties: Fundamentals	Q4
	Ch 12.4-6: Radiation Processes and Properties: Blackbody, and Surfaces	
#9	Ch 13.1: Radiation Exchange: View Factors	Q5

	Ch 13.2: Radiation Exchange: View Factors, and Network Analysis	HW4
#10	Ch 6.1-3: Intro. to Convection: Convection Equations	Q6
	Ch 6.4-7: Intro. to Convection / Ch 7.1: External Flow	
#11	Ch 7.1-3: External Flow: Flat Plate in Parallel Flow, and Methodology	Q7
	Ch 7.4-5: External Flow: Flow Across Cylinders & Spheres	HW5
#12	Ch 8.1-2: Internal Flow: Hydrodynamic & Thermal Considerations	Q8
	Ch 8.3: Internal Flow: Energy Balance	
#13	Ch 8.4-6: Internal Flow: Convection Correlations, and Non-Circular Tubes	
	Ch 9: Free Convection Basics	HW6, Q9
#14	Ch 9: Free Convection Correlations	
	<i>Thanksgiving (No class Nov. 24)</i>	
#15	Ch 11: Heat Exchangers	Q10
	Ch 13.3-4: Multimode Heat Transfer	HW7
#16	Cumulative Final Exam Saturday, Dec. 4: 8 AM – 10 AM Monday, Dec. 6: 5:30 PM – 7:30 PM	Final Exam

Link for **Fall 2021 Final Exams - Discovery Park**
<https://registrar.unt.edu/exams/final-exam-schedule/fall>