

## ***Course Syllabus***

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MECH 4380.001  
HVAC Systems  
Spring 2021

### **Course Platform**

Lectures on Microsoft Teams, all other materials on elearning

Students do not need to attend the lectures and also will have a window for delivering a homework, as well as for completing any exams. However, the lectures will be recorded by the instructor on a certain time (Tuesday and Thursday 4 PM- 5:15 PM) and will be open to all students to participate. This way the students will be able to interact with the instructor and get a feeling of a live virtual class.

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### **Professor Contact Information**

Payam Delgoshaei

Email: [payam.delgoshaei@utdallas.edu](mailto:payam.delgoshaei@utdallas.edu)

**Office Hours:** By email appointment (online meeting)

TA: Aqsa Rukhsar, [axr171531@utdallas.edu](mailto:axr171531@utdallas.edu)

**Office Hours:** By email appointment (online meeting)

**Pre-requisite:** Thermodynamics, Fluid Dynamics and Heat Transfer

### **Class Recordings**

The instructor may record meetings of this course. Any recordings will be available to all students registered for this class as they are intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

### **Class Materials**

The Instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

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**Course Description:** This course is an introduction to the analysis and design of Heating Ventilation, Air Conditioning and Refrigeration Systems. The emphasis is on the application of fundamental heat transfer and fluid mechanics principles to the analysis of HVAC systems. Topics include: Introduction to human comfort and health requirement, thermal dynamics of buildings, heating and cooling load calculations, and introduction to various active HVAC systems for residential and commercial buildings.

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### **Student Learning Objectives/Outcomes**

1. Demonstrate an understanding of the HVAC principles, importance of HVAC technology and practice of thermal comfort
2. Develop psychrometrics of moist air and apply to HVAC processes
3. Apply heat transfer and fluid dynamics concepts to perform building envelope loads (due to conduction, convection, radiation and air leakage) and select the proper HVAC system accordingly
4. Understand the principles and requirements of air ventilation
5. Apply fluid mechanics concepts and develop techniques for the analysis of duct systems and room air distribution systems
6. Predict seasonal and annual energy consumption for buildings

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**Required Textbooks and Materials:** F.C. McQuiston and J.D. Parker, Heating, Ventilating, and Air Conditioning Analysis and Design, John Wiley & Sons, Inc. 6th Edition, 2000.

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**Suggested Course Materials:** Class notes and slides

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### **Assignments & Academic Calendar**

**Midterm Exam: 3/11/2021, Thursday 4 PM - 5:30 PM**

**Final Exam: 5/11/2021, Tuesday 5 PM – 7:45 PM**

**Grading Policy:** Homework (15 points), Midterm Exam (30 points), Project (30 points), Final Exam (25 points)

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### **Course Policies**

**Make-up exams will only be given with instructor approval**, which must be granted before the exam date or under unusual circumstances. If an exam is missed due to illness, the student must bring valid proof from a doctor's office.

The assignments must be submitted before the due date and the eLearning link will be closed shortly after the deadline. Please read the instructions carefully and upload the correct file. If not submitted by the due date (or if resubmittal is required), 50% of the grade will be deducted. Missed assignments will receive a zero. If an assignment is missed due to illness, the student must provide a note from a doctor.

## **Technical Requirements**

In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the Getting Started with eLearning webpage <https://ets.utdallas.edu/elearning/students/current/getting-started>.

## **Course Access and Navigation**

The course can be accessed using the UT Dallas NetID account at: <https://elearning.utdallas.edu>. Please see the course access and navigation section of the site <https://ets.utdallas.edu/elearning/students/current/getting-started> for more information.

To become familiar with the eLearning tool, please see the Student eLearning Tutorials <https://ets.utdallas.edu/elearning/students/current/tutorials>.

UT Dallas provides eLearning technical support 24 hours a day/7 days a week. The eLearning Support Center <https://ets.utdallas.edu/elearning/helpdesk> services include a toll free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

## **Communication**

This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the eLearning Tutorials webpage <https://ets.utdallas.edu/elearning/students/current/tutorials> for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances.

## **Distance Learning Student Resources**

Online students have access to resources including the McDermott Library, Academic Advising, The Office of Student AccessAbility, and many others. Please see the eLearning Current Students page <https://ets.utdallas.edu/elearning/students/current> for details.

## **Server Unavailability or Other Technical Difficulties**

The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online [eLearning Help Desk](#). The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

### Academic Calendar

Week	Date	Topics	Reading	Assesment
1	01/18/21	<b>Course Overview &amp; Introduction</b>	Chapter 1	
2	01/25/21	<b>Air-Conditioning Systems</b>	Chapter 2	HW 1
3	02/01/21	<b>Most Air Properties and Conditioning Processes</b>	Chapter 3	HW 2
4	02/08/21	<b>Comfort and Health - Indoor Environmental Quality</b>	Chapter 4	HW 3
5	02/15/21	<b>No Class: Inclement Weather</b>		HW 4
6	02/22/21	<b>Heat Transmission in Building Structures</b>	Chapter 5	
7	03/01/21	<b>Space Heat Load</b>	Chapter 6	HW 5
8	03/08/21	<b>Space Heat Load</b>	Chapter 6	Midterm Exam
9	03/15/21	<b>No Class: Spring Break</b>		
10	03/22/21	<b>Solar Radiation</b>	Chapter 7	HW 6
11	03/29/21	<b>The Cooling Load</b>	Chapter 8	
12	04/05/21	<b>Energy Calculations and Building Simulation</b>	Chapter 9	Project
13	04/12/21	<b>Flow, Pumps, and Piping Design</b>	Chapter 10	HW 7
14	04/19/21	<b>Space Air Diffusion</b>	Chapter 11	
15	04/26/21	<b>Fans and Building Air Distribution</b>	Chapter 12	HW 8
16	05/03/21	<b>Refrigeration</b>	Chapter 15	
17	05/10/21	<b>Exam Week</b>		

**Comet Creed**

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

*“As a Comet, I pledge honesty, integrity, and service in all that I do.”*

**Academic Support Resources**

The information contained in the following link lists the University’s academic support resources for all students.

Please go to [Academic Support Resources](#) webpage for these policies.

**UT Dallas Syllabus Policies and Procedures**

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus.

Please go to [UT Dallas Syllabus Policies](#) webpage for these policies.

***The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.***