MAE 3314 – HEAT TRANSFER
Fall 2015 Syllabus

Instructor Hyejin Moon (hyejin.moon@uta.edu)
WH 306B, 817-272-2017
Office Hours: MWF 2 – 4:00 pm or by appointment.

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Class information:

- NH 110, MWF 9:00 – 9:50 am
- Webpage: Blackboard (http://www.uta.edu/blackboard/)

Course Description:
The fundamental laws of heat and mass transfer, including steady and unsteady state conduction, convection, and radiation. Applications of heat transfer to thermal systems design are included. **Required course**. **Prerequisites** - MAE 3360, MAE 2314, MAE 3310.

Textbook:
Fundamentals of Heat and Mass Transfer, 7th edition by Incropera, DeWitt, Bergman, and Lavine (John Wiley & Sons, New York).

Key Assignments:
This course specifically assesses five outcomes and designated key assignments are used for each outcome evaluation as shown the table below.

Outcome	Description	Key assignment	Passing score
A	An ability to apply knowledge of math, science, and engineering	Homework #2, 3	70 out of 100
C	An ability to design a system, component, or process to meet desired needs	Design Project #1	70 out of 100
E	An ability to identify, formulate, and solve engineering problems	Homework #2, 3	70 out of 100
I	Recognition of the need for and an ability to engage in life-long learning	Design Project #1	70 out of 100
K	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice	Design Project #1	70 out of 100

In order to pass this course, students must submit and pass all key assignments. If any key assignment is not submitted and passed, the student will not pass the course even if he/she scores perfectly on all exams and other assignments.

Exams & Grading:

	Percentage per set	Number of sets	Total percentage
Homework 1, 4-9	1	7	7
Homework 2, 3	1	2 (These are K.A.)	2
Design Project 1	10	1 (This is K.A.)	10
Design Project 2	6	1	6
Tests	15	5	75

Letter grading will be based on the following scale:
A (above 90%), B (80 – 80.9%), C (70 – 79.9%), D (60 – 69.9%), and F (below 60%)

Course Requirements:

1. Attendance – Students are expected to attend all class sessions, complete reading assignments, and participate in class discussions. If a student misses a class, it is his/her responsibility to make up the missed class.
2. Homework and Design Assignments – Credit will be given only if the problems are turned in on time. Some suggestions on problem solving approach:
   - Present all work in a clear and neat manner.
   - Show all the steps in your analysis.
   - Check to see that the result is correct dimensionally (units).
   - Please underline or circle your final answers.
3. Key Assignments – In order to pass this course, **you must pass all Key Assignments**. If any Key Assignment is not passed, you will not pass the class even if you score perfectly on all exams and other assignments.
4. Tests – There will be **5 in-class tests**. **There will be no make-up tests.** You must take all tests at the scheduled time.
5. Academic honesty – It is the philosophy of the University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. (Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.2.2).
6. Students with disability – If you need accommodations in compliance with the ADA, consult with the instructor.

Course Content and Schedule:

Week	Date	Subject	Textbook	Homework (Due) * Key assignments
0	8/28	Introduction to heat transfer	1.1 – 1.6	
1	8/31	Introduction to conduction	2.1 – 2.2	
	9/2	Heat equation	2.3	
	9/4	Boundary and initial conditions	2.4	#1 (9/5)
2	9/7	**Labor day holiday**		
	9/9	Boundary and initial conditions	2.4	
	9/11	1D steady conduction: plane wall	3.1	**#2 (9/16)**
3	9/14	Thermal resistance	3.2	
	9/16	1D steady conduction: radial system	3.3	
	9/18	1D steady conduction: radial system	3.3	**#3 (9/25)**
4	9/21	**Test #1**	Ch. 2, 3	
	9/23	Fins	3.6	
	9/25	Fins		**Design 1 (10/19)**
5	9/28	2D conduction and FDM	4.1– 4.4	
	9/30	2D conduction and FDM	4.1– 4.4	
	10/2	Transient conduction: lumped method	5.2 – 5.3	#4 (10/7)
6	10/5	Transient conduction: lumped method	5.2 – 5.3	
	10/7	Transient conduction: spatial effect	5.4 – 5.5	
	10/9	Transient conduction: spatial effect	5.6 – 5.8	
7	10/12	**Test #2**	Ch. 5	
	10/14	Intro to convection	6.1 – 6.3	
	10/16	Boundary layer equation	6.4	#5 (10/23)
8	10/19	Boundary layer similarity	6.5 – 6.6	
	10/21	Boundary layer analogies	6.7	
	10/23	External flow: flat plate	7.1 – 7.2	#6 (10/28)
9	10/26	External flow: flat plate	7.1 – 7.2	
	10/28	External flow: cross flow	7.4 – 7.5	
	10/30	**Test #3**	Ch. 6, 7	
10	11/2	Internal Flow	8.1 – 8.2	
	11/4	Internal Flow	8.3 – 8.4	
	11/6	Internal Flow	8.5 – 8.7	#7 (11/13)
11	11/9	Free convection	9.1 – 9.9	
	11/11	Free convection	9.1 – 9.9	
	11/13	Boiling and Condensation	10.2, 3, 6	Design #2 (11/30)
12	11/16	Heat exchangers	11.1 – 11.2	
	11/18	Heat exchangers	11.3	
	11/20	**Test #4**	Ch. 8, 11	
13	11/23	Intro to radiation	12.3 – 12.8	#8 (11/30)
	11/25	Blackbody radiation	12.3 – 12.8	
	11/27	**Thanksgiving holiday**		
14	11/30	Plank's Equation, Kirchhoff's Law	12.3 – 12.8	#9 (12/7)
	12/2	View factor	13.1 – 13.4	
	12/4	Radiation exchanges	13.1 – 13.4	
15	12/7	Radiation exchanges	13.1 – 13.4	
	12/9	**Test #5**	Ch. 12, 13	